THE AMERICAN
JOURNAL OF PHARMACY

MAY, 1898.

COMPARATIVE ACCURACY OF TITRIMETRIC AND GASOMETRIC METHODS OF ESTIMATING HYDROGEN DIOXIDE IN PRESENCE OF VARIOUS PRESERVATIVE AGENTS.

By Carl E. Smith.

(Report from Research Committee D, Section II, of the Committee of Revision of the U. S. Pharmacopœia.)

The method of estimating hydrogen dioxide most extensively used is that of titration with potassium permanganate. Besides being more readily applied than any other, this method has always been presumed to give accurate results, at least sufficiently so for all practical purposes. Dr. Charles Rice, however, has observed that its accuracy is affected by the presence of glycerin, which some manufacturers add to the solutions to give them stability. A variety of other substances have from time to time been reported to be in use for the same purpose, and it was suspected that at least a part of them might also exert an influence on the results of the method. Such substances are boroglycerin, boric, salicylic and benzoic acids, acetanilid, salol, etc. It was important, therefore, to know if the inaccuracies introduced by the presence of glycerin or any other of the above enumerated substances are so great as to make the method worthless, and, if so, whether a method could be found that is not affected by these additions, one that could be relied upon under any conditions likely to occur in the assay of commercial solutions of hydrogen dioxide. It was the writer's task, for this pur-

pose, to make comparisons of the more prominent titrimetric and gasometric methods under such conditions as might be encountered in practice. The experiments were confined to four methods, a description of which will first be given.

Titrimetric Permanganate Method.—When a solution of potassium permanganate is gradually added, with agitation, to a solution of hydrogen dioxide containing sulphuric acid, the permanganate is decolorized through the formation of manganous sulphate, and all available oxygen is liberated from the hydrogen dioxide, together with an equal amount from the permanganate. When the last drop of the solution added leaves a permanent red color after agitation, the reaction is ended. It proceeds in accordance with the following equation:

$$5H_2O_2 + 2KMnO_4 + 3H_2SO_4 = 5O_2 + 2MnSO_4 + K_2SO_4 + 8H_2O.$$

If 1 c.c. of hydrogen dioxide solution is taken and a $\frac{N}{10}$ solution of permanganate used, the number of cubic centimeters required to produce a permanent red color, multiplied by 0·56, will indicate the number of volumes of available oxygen yielded by one volume of the sample.

Gasometric Permanganate Method.—The reaction made use of in this method is the same as in the preceding one, the principal difference being in the direct measurement of the liberated oxygen instead of its calculation from the amount of permanganate consumed. The operation is performed in a gasometer, or nitrometer, several forms of which have been devised. A description of the form best suited to this work and its use will be found in the Appendix of the U. S. P. of 1890, under "Gasometric Estimations," and in the Dispensatories. The writer operated in the following manner: The measuring tube, graduated to 100 c.c., is filled with a saturated solution of sodium chloride, 2 c.c. of the sample are accurately measured into the funnel tube and slowly let into the measuring tube, care being taken that no air is admitted. Ten c.c. of 10 per cent. sulphuric acid are then admitted in the same manner, and finally 20 c.c. of a 2 per cent. solution of potassium permanganate. When the reaction has nearly ceased, the tube is inverted a few times to insure complete decomposition of the hydrogen dioxide. This must be repeated several times within the

next five minutes, on account of the voluminous precipitate of hydrated manganese dioxide, which prevents small bubbles of gas from rising to the top. The tube is then placed in a vertical position, and, when the volume of gas becomes constant, the liquid in the equilibrium tube is adjusted to the same level as that in the measuring tube. The volume of gas is then read and the temperature noted. Since the standard of strength of hydrogen dioxide solutions is *not* based on the volumes of oxygen yielded at ordinary room temperature, but on the volume the gas would occupy at 0°C. and 760 millimetres barometric pressure, a correction is required for accurate determinations. The writer made correction for variation in temperature only, as sufficient for ordinary purposes. The reader is referred to the Pharmacopœia for the formula and tables required for this. It should not be omitted, as the error would be quite considerable. A solution yielding 10 volumes of oxygen at 0°C., would yield 10·55 volumes at 15°, 10·75 volumes at 20°, 10·9 volumes at 25°, etc.

In the writer's hands this method does not give very encouraging results. Duplicate estimations differ much more than with other methods, the precipitated manganese dioxide collects near the top of the liquid, and makes a close reading of the volume impracticable, besides obstructing the passage of gas bubbles. While not entirely worthless, it is much less satisfactory than the following method.

Gasometric Hypochlorite Method.—This method is recommended by D. B. Dott (*Ph. J. Tr.*, 1890 p. 833), who uses a solution of ordinary bleaching powder, also filling the apparatus with it instead of sodium chloride solution. Mr. Dott obtains appreciably higher results than by titrimetric methods, and concludes the method to be more accurate than the latter. The reaction is analogous to that of the permanganate methods, as follows:

$$Ca(ClO)_2 + 2H_2O_2 = 2O_2 + CaCl_2 + 2H_2O.$$

In some of the present writer's experiments a solution of chlorinated soda of approximately U.S.P. strength was used, in others a solution of chlorinated lime containing about 4 per cent. of available chlorine. Preference is given to the latter, as with the other a white, flocculent precipitate (probably sodium hydrate and carbonate) is formed, which is open to the same objections as that incidental to

the permanganate method. A saturated solution of sodium chloride was used in all cases for filling the gasometer. Two c.c. of the sample are admitted into the measuring tube, the funnel tube rinsed with a little water, this also let in and then 20 c.c. of the chlorinated lime solution added. From this point the procedure is the same as explained under the permanganate method.

With solutions containing in addition to hydrogen dioxide only small quantities of mineral acids and alkali salts, quite satisfactory results were obtained by this method, but in the cases of solutions to which any of the various preservatives had been added, there was a decided tendency, almost throughout, toward too low results. No appreciable error seems to be introduced through the solubility of oxygen in the liquid, above which the gas is collected, as no higher results were obtained when the liquid had previously been saturated with oxygen.

Titrimetric Thiosulphate Method.—This was first recommended by C. T. Kingzett (*Jour. Chem. Soc.*, 1880, Vol. 37, p. 802), and later by H. Thoms (*Arch. Pharm.*, 1887, Vol. 35, pp. 335–343). It is based on the fact that hydrogen dioxide liberates a definite quantity of iodine from iodides in acid solution, the iodine being titrated with sodium thiosulphate, in the usual manner.

$$H_2O_2 + 2KI + H_2SO_4 = I_2K_2 + SO_4 + 2H_2O;$$
$$I_2 + 2Na_2S_2O_3 = 2NaI + Na_2S_4O_6.$$

Thoms proceeds by warming 0·5 gramme of potassium iodide, 1 gramme of 20 per cent. sulphuric acid and 50 c.c. of water to 40° C., adding 0·5 c.c. of the hydrogen dioxide solution, shaking about five minutes, and titrating the liberated iodine with $\frac{N}{10}$ thiosulphate, then warming again to 40°, again titrating the appearing iodine, and repeating until no further liberation of iodine takes place. Carried out in this way the method is rather slow and tedious, requiring at least fifteen minutes for completion; but, since it was stated to be accurate, the writer decided to include it in his experiments, and found later, that by omitting the greater part of the water, so as to reduce the bulk of the solution to about 15 c.c. for the above-mentioned quantities, heating might be dispensed with, and the reaction would nevertheless be ended within five minutes. The final result was found to be the same, whether

working with dilute or with concentrated solutions. One possible source of error with the latter is that, when standing in a very warm room prior to titration, slight losses of iodine might occur through vaporization. This could, of course, be readily seen and proper precautions taken to prevent loss. The following mode of operation is considered the most practical: Dilute the solution to be tested to exactly ten times its volume with distilled water, measure 5·6 c.c. of the dilution (= 0·56 c.c. of sample) into a beaker or flask, add 5 c.c. of 10 per cent. sulphuric acid and 5 c.c. of a 10 per cent. solution of potassium iodide, and let the mixture stand for five minutes. Then gradually add $\frac{N}{10}$ thiosulphate, with constant agitation, until the color of the solution is discharged. If the solution remains colorless upon standing a few minutes longer, the titration is finished. If a color should appear, add sufficient thiosulphate solution to remove it. The total number of cubic centimeters of the thiosulphate solution required indicates the number of volumes of available oxygen the sample contains. If it is considerably stronger than ten volumes, the result will probably be too low, unless more time is allowed for the reaction. In such a case correspondingly more potassium iodide and sulphuric acid should be taken. No starch paste is necessary, as the endreaction is sufficiently sharp without it, particularly when the solution is placed over a white surface. In cases in which an accurate dilution of the sample is impracticable, 1 c.c. of the undiluted sample may be taken, with double the quantities of reagents given above. The number of cubic centimeters of $\frac{N}{10}$ thiosulphate required must then be multiplied by 0·56 to obtain the strength in available oxygen. Or, instead of $\frac{N}{10}$ thiosulphate (24·8 grammes of crystallized salt per liter), a solution containing 44·29 grammes per liter may be used. In the latter case each cubic centimeter consumed indicates one volume of available oxygen, provided 1 c.c. of sample has been taken. The per cent. of hydrogen dioxide is obtained by multiplying the volume strength by 0·3038. (This is not strictly correct, as the specific gravity of the solution is left out of consideration.) It is important that the reagents used are free from such impurities as would act as reducing or oxidizing agents.

The sulphuric acid should be free from sulphurous, arsenous and nitric acids, and the potassium iodide from iodate. Sodium thiosulphate (commercially called "hyposulphite of soda") is very frequently found in the market of a sufficiently high degree of purity to make it permissible to prepare the $\frac{N}{10}$ solution, for the assay of hydrogen dioxide, by dissolving exactly 24·8 grammes of it in enough distilled water to make 1 liter, instead of standardizing it with iodine. It should be in colorless, transparent, uneffloresced crystals, and contain no chloride or sulphate, or at most only traces of sulphate. The crystals should be coarsely powdered and any interstitial motherliquor removed by pressing between folds of bibulous paper before weighing. The writer, however, prefers to recrystallize the commercial salt and finds the solution prepared from this, in the manner indicated above, fully as accurate as when standardized with pure iodine.

This method has been treated of more at length than the others, because it proved to be the best of those examined, as will be explained more fully below.

Comparison of Methods on Commercial Samples.—A few commercial solutions of hydrogen dioxide of varying strength and purity were examined with the object of gaining some knowledge of the comparative accuracy of the four methods described. The pharmacopœial tests were also applied and the results embodied in the following table:

	Sample I.	Sample II.	Sample III.	Sample IV.
St'ng'h by $KMnO_4$ (titr.) method	10·3; 10·35 vol.	15·45; 15·45 vol.	29·45; 29·35 vol.	26·65; 26·65 p c.
St'ng'h by $KMnO_4$ (gasom.) method	10·6; 10.3; 10·1; 10·4 vol.	15·5; 15·35 vol.	30·15; 31·6 vol.	27·85; 26·7 p.c.
St'ng'h by $Ca(ClO)_2$ method	10·45; 10·4 vol.	15·5; 15·55 vol.	29·7; 29·9 vol.	26·95; 27·2; 27·1 p.c.
St'ng'h by $Na_2S_2O_3$ method	10·3; 10·35 vol.	15·5; 15·55 vol.	29·4; 29·4 vol.	26·2; 26·4 p.c.
Acidity in cub.cms. of $\frac{N}{1}$ soda requ'd for 50 c.c.	1·85 c.c.	0·95 c.c.	2·1 c.c.	Neutral
Residue from 50 c.c. at 100° C.	0·339 gm.	0·029 gm.	0·124 gm.	0·015 gm. from 1 tube (3·025 gm.)
Impurities found	HCl, NaCl, H_3PO_4	HCl, H_3PO_4	HCl, H_2SO_4, H_3PO_4	Not identified

No barium salts or fluorides were detected by the U.S.P. tests. The limit of acid (0·5 c.c. of $\frac{N}{1}$ soda for 50 c.c.) was exceeded in three samples. The limit of residue (0·25 grammes for 50 c.c) was exceeded in one. Nos. I, II, and III are aqueous solutions, stated to contain respectively 10, 15, and 30 volumes of available oxygen, while No. IV is an ethereal solution claimed to contain 25 per cent. of hydrogen dioxide. These claims as to strength are reasonably well supported by the results obtained. It will be seen that with some samples the results by the different methods vary more than with others, the differences being greatest in the case of Sample IV. Subsequent experiments showed the discrepancies in this case to be at least partially due to the presence of ether, and the fourth method to be the most trustworthy for the assay of ethereal solutions. The first, third, and fourth methods are fairly well in accord with each other, but the second frequently gave figures differing not only from those obtained by other methods, but also differing widely among themselves in duplicate estimations. This method, because of its seeming unreliability, was left out of consideration in later experiments.

Estimation in Presence of Preservative Agents.—In the experiments to be described, Sample II was used, as it proved to be the purest of the aqueous solutions at the writer's disposal. The mixtures were prepared by diluting 13·35 c.c. of this solution, containing 15·45 volumes of available oxygen, to 100 c.c. with distilled water, after adding a definite quantity of the substance whose influence on the methods was to be determined. Five c.c. of the dilution represent 1 c.c. of a solution of two-thirds the above strength, or 10·3 volumes. It was thought best to base the calculations on this latter standard of strength, as being the more customary one. The percentages given in the table below, of preservative substances added, were also based on this standard. In some cases these were added in the quantity that would be required to make a saturated solution in the amount of 10 volume solution present; in other cases much larger quantities were taken. The results are given in volumes of available oxygen.

Substances Added.	Permanganate Method, Titrimetric.	Hypochlorite Method.	Thiosulphate Method.
Glycerin, 5 p.c.	10·55; 10·45	10·2; 10·25	10·25; 10·25
Boroglycerin, 5 p.c.	10·45; 10·5	10·15; 10·05	10·25; 10·3
Boric acid, 5 p.c.	10·3; 10·25	10·3; 10·2	10·3; 10·25
Boric acid, 20 p.c.	10·3; 10·3	10·1; 10·15	10·3; 10·35
Salicylic acid, 0·2 p.c.	11·3; 11·5	9·6; 9·7	10·3; 10·3
Salicylic acid, 2 p.c.	15·0	9·55; 9·4	10·3; 10·4
Benzoic acid, 0·2 p.c.	10·45; 10·4	10·15; 10·15	10·45; 10·4
Salol, saturated solution*	10·25; 10·25	10·0; 9·85	10·2; 10·2
Acetanilid, 0·5 p.c.	10·3; 10·3	10·1; 10·2	10·25; 10·25
Ether, 10 p.c.	10·35; 10·35	10·65; 10·7	10·25; 10·25

* Prepared by diluting 13·35 c.c. of H_2O_2 solution with a cold, aqueous, saturated solution of salol to 100 c.c.

These results show that the accuracy of the titrimetric permanganate method is affected slightly by the presence of moderate quantities of glycerin or boroglycerin, but that in the presence of the quantities that would be added to the solutions by manufacturers, which would hardly exceed 1 per cent., the difference in result would not be noticeable. In presence of salicylic acid, however, the method is worthless. There is evidence also, that ether is not entirely without influence. It may be stated, then, as a generalization, that in presence of organic substances, titration with potassium permanganate cannot be depended upon to always give sufficiently accurate results for pharmacopœial purposes.

With the hypochlorite method there is a tendency toward low results, most marked in presence of salicylic acid. The presence of ether introduces an error, which is probably due largely to the increased vapor tension. While the inaccuracies of some of the results of this method may be partially attributed to a neglect to make corrections for variation in barometric pressure and for the tension of water vapor, it was proven by parallel estimations during the same atmospheric pressure, that some of the added substances without doubt exert an influence on the volume of gas liberated. This method, then, is also unreliable in presence of organic matter, but less so than the permanganate methods.

The accuracy of the thiosulphate method is practically unaffected by the addition of any of the substances given in the table. The differences in the results are probably due as much to variation in

measuring, etc., as to any other cause and it would seem that, under such conditions as are at all likely to occur in practice, the method can be depended upon to give very serviceable results.

Estimation in presence of larger quantities of glycerin.—In view of the fact that hydrogen dioxide is sometimes used medicinally in combination with glycerin, and that assays of such mixtures, containing comparatively large proportions of glycerin, may become necessary, trials were made to determine the comparative accuracy of the several methods under such conditions. A 10·3 volume solution was used and the results are stated in volume strength.

Grammes of glycerin added to 1 c.c. of solution.	Permanganate method (titr.)	Permanganate method (gasom.)	Hypochlorite method.	Thiosulphate method.
0·5	10·8			
1·	11·25; 11·2	9·95; 9·8	10·5; 10·55	10·3; 10·3
2·	12·25		10·5; 10·4	10·35

It is seen that the thiosulphate method is first and the hypochlorite second in point of accuracy, while the two others are worthless. With permanganate the reaction is at first extremely slow, but it gradually quickens and the permanganate is decolorized as rapidly as it is added until near the end, when it again becomes very slow.

Summary.—The titrimetric permanganate method is accurate and reliable for the valuation of solutions containing only mineral acids and their alkali salts as impurities. With solutions containing glycerin or boroglycerin in quantities below 5 per cent. the results are but slightly raised; in presence of larger amounts the method is inapplicable. Ethereal solutions give results a little too high. Salicylic acid interferes seriously, even in small quantity. The use of this method should be avoided whenever organic matters are suspected to be present. Applied gasometrically, the permanganate method is unreliable in all cases.

The hypochlorite method gives serviceable results in absence of preservatives. In their presence they are liable to fall too low, and with ethereal solutions they are too high.

The thiosulphate method is simple, rapid and accurate, and its accuracy is not lessened by the presence of the usual preservative agents, nor by large quantities of glycerin. It is applicable in all cases, so far as known. It can be said of gasometric determinations

in general, that they require more time, attention and apparatus than titration methods, and that the results obtained by them cannot be expected to approach the latter in accuracy, unless suitable corrections, requiring tedious calculations, are made for variation in temperature and atmospheric pressure at least.

The work described in this paper was undertaken at the suggestion of Dr. Charles Rice, and the writer wishes to acknowledge valuable advice received from Dr. Rice as also from Prof. Coblentz.

PHARMACEUTICAL LABORATORY OF THE
NEW YORK COLLEGE OF PHARMACY, March, 1898.

NOTE ON BOTANICAL NOMENCLATURE.

BY JOHN URI LLOYD, PH.M., PH.D.

In the minutes of the Pharmaceutical Meeting for March, I notice that Professor Kraemer prefers "the common names of plants as being less confusing."

While that brief note cannot give the breadth of the subject under discussion, and is liable to misinterpretation, still I feel it to be a duty for me to give my experience in a commercial way with some of these plant names. It is, perhaps, the more a duty since both my brother, Curtis, and myself once strenuously advocated the use of *botanical* names only, having gone so far as, in print, to criticise the use of common names by physicians and pharmacists. But subsequent experience, that is unnecessary for me to record in detail, made it necessary for us not only to acquiesce in the use of certain common names, but to publicly advocate them, and in prices current wherein all the botanical remedies used in medicine are named, we years ago excluded from the list the botanical names of certain remedies, referring to them only in notes. In this connection the Euphorbias and Eupatoriums may be cited as examples, experience having shown that physicians and pharmacists alike have less trouble in distinguishing their common names than carrying the botanical distinctions. But there must be a discriminating selection of common names, for the use of such common names as Indian Hemp, Willow Herb, etc., is to be deplored, since they in turn create confusion.

The result of this experience may be of use to others, and I,

therefore, take the liberty to record the names of the drugs to which, in our experience, common names should be applied, as follows:

Asthma Weed, for Euphorbia pilulifera (to distinguish it from other species of Euphorbia).

Black Haw, for Viburnum prunifolium (to distinguish it from Viburnum opulus).

Fragrant Sumach, for Rhus aromatica (to distinguish it from Rhus Toxicodendron).

Gravel Root, for Eupatorium purpureum (to distinguish it from Eupatorium perfoliatum).

Horse Chestnut, for Æsculus Hippocastanum (to distinguish it from Æsculus glabra).

Spikenard, for Aralia racemosa (to distinguish it from Aralia nudicaulis).

Spotted Spurge, for Euphorbia hypericifolia (to distinguish it from Euphorbia corollata and Euphorbia pilulifera).

Swamp Milkweed, for Asclepias incarnata (to distinguish it from Asclepias cornuti and Asclepias tuberosa).

White Snake root, for Eupatorium aromaticum (to distinguish it from Eupatorium perfoliatum and Eupatorium purpureum).

LARREA MEXICANA.

By Clement B. Lowe, M.D.

Last year I received a small quantity of the above-named plant from W. C. Amsden, Ph.G., Class of 1890, of Garner, Iowa, saying that it had been sent by an uncle in California, and requesting information about it. Afterwards, at my request, Mr. Wm. H. Avery, of Los Angeles, California, sent on an ample supply of the drug.

The chemical investigation was carefully performed in the Chemical Laboratory of the College by Wm. E. Krewson, Jr., P.D., Class of 1898.

From the "Botany of California" (Brewer, Watson and Gray), the Botany of the U. S. Death Valley Expedition, 1891, and from other sources, much has been learned about this interesting plant. It was first described by Moricaud, *Pl. Nouv. Amer.*, 71 (1833-46) as Larrea mexicana, N. O. Zygophyllaceæ. Fremont, who met the plant in the Mohave Desert, named it Zygophyllum californicum. In 1848 Engleman published the plant as L. glutinosa. It was named by the government botanist L. tridentata.

It is called by the Mexicans Gobernadora and Hideondo, and popularly Creosote Bush and Greasewood.

The habitat of the plant is rather an extensive one. It is found abundantly in the dry valleys of Kern County and in the Death Valley of Inyo County, California, and eastward from Walker's Pass and Talhichipi to Western Texas, and southward into Mexico; also along the lower Muddy River in Nevada and the Santa Clara Valley of Utah.

The plant is a diffusely branched, densely leafy evergreen shrub, 4–10 feet high. The leaves and small twigs are thinly spread with a covering of a strongly-odorous resin that closely resembles in appearance ordinary shellac. To the abundance of this resinous matter the plant's popular name of creosote bush is due, for in burning the green wood and leaves a pungent odor is detected and a dense smoke arises. The dead branches remain for many years without decomposing, and, although seldom more than 2 or 3 centimeters in diameter, they furnished the principal fuel to the Death Valley Expedition.

The functions of the resin seem to be to lessen transpiration, and thus to adapt the plant to the dry localities in which it grows. If this coating completely covered the leaves throughout the entire year, all evaporation would cease and the death of the plant would ensue, but it has been found that while the leaves in the winter time seem thoroughly varnished, the spring growth examined in June shows very little coating. As many of the herbarium specimens are gathered at this season of the year during the flowering period, they seldom show the resinous coating conspicuously, as it has not yet developed.

The leaves are nearly sessile; the thick resinous leaflets unequilateral, oblong, 3–6 lines long, with a broad attachment of the midrib, somewhat curved and acute. The flowers are solitary, bright yellow, consisting of five ovate, obtuse, silky, deciduous sepals; five unguiculate petals; ten stamens on a small ten-lobed disk, and a five-celled ovary, the cells about six ovuled. The fruit is globose, two and a half lines in diameter, densely hairy, consisting of five indehiscent one-seeded carpels, which at length separate from the axes.

It is said that no animal of the country will eat the plant. It has various reputed properties. Miners say that a strong decoction will

clean amalgam. It is reported that the Indians make a glue from it, with which they fasten the heads of the arrows to the shafts.

Mr. Avery says "that people living in the desert ascribe wonderful properties to it for curing external ailments, as galls and bruises on horses and mules. Pedestrians who become footsore by walking on hot sand claim to have been quickly cured by soaking the soles of their feet in a decoction of this herb."

The following is a summary of the analysis made by Mr. Krewson:

Moisture, 7 per cent.; ash, 7·45 per cent.

Extracted by petroleum ether, 1·87 per cent. { soluble in water, 28·18 per cent. / caoutchouc, ·43 per cent. / fixed oil and fat, ·93 per cent.

" " stronger ether, 17·27 per cent. { resins and / vegetable acids.

" " alcohol, 7·30 per cent. { resins, chlorophyll and / vegetable acids.

" " water, 11·71 per cent. { mucilage, 1·92 p. c.; dextrin, 4·33 p. c.; / glucose, ·31 p. c.; sucrose, ·12 p. c.

" " alkaline water, 6·24 per cent. { albuminous and mucilaginous / matters, ·13 per cent.

" " acidulated water, 3·17 per cent. (pararabin, 1·59 per cent.)

Starch, 3·21 per cent.

From the analysis, and the report of its uses, it is seen that when used externally it has strong antiseptic and stimulant properties. Its pharmacy has not been studied, but an excellent ointment might be prepared by incorporating a definite amount of the resin with lard, or by digesting upon a water-bath the leaves of the plant with lard. It is possible that when used internally it will prove a stimulating expectorant analagous to eriodictyon.

ALKALOIDAL CONSTITUENTS OF CASCARILLA BARK.[1]

By W. A. H. Naylor, F.I.C.

This paper is intended to be a reply in the main to question No. 12 of the "Blue List" issued by the British Pharmaceutical Conference. The question is: "A re-examination of cascarilla bark is desirable, and particularly with reference to the observation that it contains an alkaloid closely allied to choline." This particular reference to choline is to be found in a paper by Dr. Boehm, an abstract of which appears in the "Year Book of Pharmacy," 1886, page 168.

[1] *Pharmaceutical Journal*, March 19, 1898.

Fourteen pounds of bark, reduced to No. 40 powder, were exhausted by percolation with chloroform water containing 3 per cent. of oxalic acid. The percolate was made faintly alkaline by ammonia evaporated at a low temperature to one-fifth of its volume, allowed to become cold, and filtered from the crystallized magma which had separated out. The filtrate was precipitated by an excess of lead acetate, and the precipitate collected on a calico filter and well washed. After removal of the excess of lead by the addition of sulphuric acid, the clear liquor from the lead sulphate was rendered faintly alkaline by ammonia and agitated with three successive portions of ether to withdraw the cascarillin that should be present. The same liquid was next shaken in a like manner with chloroform. The chloroformic residue will be referred to presently. The next stage in the series of operations consisted in acidulating the liquid with sulphuric acid (a large excess of acid must be avoided) and adding to it Thresh's reagent in quantity sufficient to effect complete precipitation. The precipitate, after being washed on a filter until quite free from free iodine, ammonium or potassium salts, was decomposed by freshly precipitated silver carbonate in the presence of water and filtered. The filtrate was faintly acidulated with hydrochloric acid and evaporated over a water-bath and again filtered. This final filtrate was precipitated by platinic chloride, and the precipitate was collected and thoroughly drained. The double compound of base and platinum salt was repeatedly crystallized from water and finally washed with absolute alcohol.

The purified platinum compound crystallized from hot water in dark yellow hexagonal plates, and from weak alcohol in octahedral form. A portion of the product was dissolved in hot water and decomposed by sulphuretted hydrogen and filtered. The filtrate was evaporated to dryness, and the residue purified by re-solution in a sufficiency of warm water and evaporation until a white minutely crystalline chloride of the base was obtained. This chloride, when perfectly dry, was practically insoluble in alcohol, and when heated it melted with intumescence and gave off trimethylamine.

Portions of platinum compound were then ignited, with the following results: It should be stated that they represent the product of three different extractions of the bark. Prior to ignition they were dried at 105° C.

(1) 0·215 of platinum compound left on ignition 0·065 of platinum.
(2) 0·335 " " " " 0·100 "
(3) 0·120 " " " " 0·0365 "

(1)	(2)	(3)	Theory of Betaïne.	Theory for Choline.
30·23	29·85	30·41	30·28	31·65

Mean, 30·16 per cent. of platinum.

That the chloride of this base yields on ignition trimethylamine, indicates that it is allied to choline. That its chloride is practically insoluble in alcohol and melts with intumescence on heating, and that its platinum salt yields a mean of 30·16 per cent. of platinum, prove beyond a doubt that the base in question is not choline, but betaïne.

CHLOROFORMIC RESIDUE.

It was treated with warm hydrochloric acid, 3 per cent., the filtered solution was made alkaline with ammonia and then shaken with chloroform. After evaporation of the chloroform the residue was taken up with the weak acid, and, after the addition of ammonia, was again shaken with chloroform. The product, which was not quite free from color, was alkaline and soluble in alcohol, ether and chloroform. It contained nitrogen. A solution of a portion of it in weak acid was precipitated by ammonia, also by iodine and potassium iodide, Mayer's reagent, Thresh's reagent, cadmium and potassium iodide, and phosphomolybdate of sodium. To the solution of another portion in weak acid the addition of platinic chloride gave a buff-colored precipitate, which was collected and washed free from platinum chloride. When air-dried it was soluble in alcohol and crystallized from hot water in prismatic plates. This alkaloidal substance was also obtained from the impure cascarillin yielded by Alessandri's process. The existence of a base in cascarilla bark other than one allied to choline has been a debatable point, but may now be accepted as a fact. It is believed that this is the first time that the alkaloid cascarilline has been isolated and its platinum compound prepared.

My thanks are due to Mr. John J. Bryant for his assistance in carrying out the operations described in this paper.

GLEANINGS FROM THE MEDICAL JOURNALS.

By Clement B. Lowe, M.D.

SERIOUSLY GRAPPLING WITH THE CHARITY ABUSE.

We are pleased to learn that there is one hospital that is in earnest in trying to limit the abuse of its charities. This is the *Philadelphia Polyclinic*. While its New York namesake is doing all it can to increase the abuse and oppose the limitation in that city, in our own institution "no member of its staff is expected to treat free any patient who can pay for medical attendance, either in its dispensaries, wards or private rooms. It has, by rule, prohibited the giving of compensation or 'refreshments' to patrolmen or others bringing patients to the hospital. More than a year and a half ago it had printed the following blank, which is placed in the hands of the doorkeeper to be given to each person who appears not entitled to treatment, with the statement that he must have it properly filled out and bring it back before he can be treated in the institution:

"I hereby certify that I am unable to pay for the services of a doctor, and on that account consider myself a proper person for free treatment in the dispensaries of the Polyclinic Hospital.

"Name

"Address

"The following persons know that I am not able to employ a doctor:

"Name

"Address

"Name

"Address

"It is of interest to note that not one of the persons to whom such a form has been given has returned with it properly filled out. The presumption is that they have either gone to the office of some

physician, or have applied at some other institution where no unpleasant questions were asked. The Faculty has also appointed a committee to consider the Abuse of Medical Charities, and to join with committees appointed for a similar purpose by medical societies, other hospital and charity organizations, in devising means to remedy the more important abuses." All honor to the Philadelphia Polyclinic! Let the rest go and do likewise, or fall under the ban of professional disrespect.—*Phila. Med. Jour.*, March 19, 1898.

The above will receive the hearty commendation of every member of the pharmaceutical profession.

FOR CHRONIC DIARRHŒA.

℞. Cupri sulphat., Morphiniæ sulphat., } āā gr. i
Quininiæ sulphat., gr. xxiv

M. fit. pil. No. xii.—Sig.: One pill three times daily.—*Med. News*, March 12, 1898.

INSANITY ON THE INCREASE IN PHILADELPHIA.

The condition of the Insane Department of the Philadelphia Hospital, recently reported by the grand jury, is interesting in many ways. According to the report, the admissions to this department have increased 85 per cent. within the last ten years, while the proportion of the poor has decreased proportionally to the population and in point of actual numbers. So crowded has this department become that 1,400 patients are accommodated in buildings intended for less than 900. In both the male and female departments, additional quarters are being constructed, which will only permit of accommodations for 100 or 150 more. Beds have had to be placed in the aisles and passage-ways, in order to give sleeping facilities. To properly care for all the insane, the Board of Charities and Corrections have asked that the districts of Germantown, Frankford and Roxborough be consolidated with Philadelphia.—*Jour. Amer. Med. Assoc.*, March 26, 1898.

FOR SPASMODIC CROUP.

Stimson advises the following treatment, which, in his hands, has proved successful even in very severe cases. The child is first given an emetic in warm water in teaspoonful doses. It is then put in a hot bath, and, after this, flannels wrung out of hot mustard water (four teaspoonfuls of mustard to the quart) are applied to the neck

and chest. A 2 per cent. cocaine spray is of great service in overcoming the laryngeal spasm. After the immediate danger is past, the following mixture should be given until the catarrhal symptoms have disappeared:

℞. Syr. scillæ, ℥iss
Tr. opii camphorat., ℥ii
Tr. tolutan, } āā ℥i
Glycerini, }
Aq. dest., q.s. ad ℥iij

M. et Sig.: One-half teaspoonful every three hours of the day, and every four hours at night.—*Med. News*, March 19, 1898.

BOILED ANTITOXIN.

A physician wrote to a manufacturer of antitoxin, inquiring whether the syringe or the antitoxin was to be boiled before using? It need hardly be said that boiling, of course, destroys the albuminous material, and yet the manufacturer writes us that he has on hand something like $13 worth of boiled antitoxin returned by physicians who gained wisdom by expensive experience.—*The Phila. Med. Jour.*, March 26, 1898.

THE COMMUNICATION OF VENEREAL DISEASE A CRIMINAL OFFENCE.

A measure is just being discussed before the German Reichstag, whose purpose is the prevention of the spread of venereal disease. Any one found guilty of having communicated a venereal disease to another shall be punishable by *fine and imprisonment.* Certain circumstances are considered to mitigate the offence, especially in the married, and when the disease has been innocently acquired. It is an attempt to solve a difficult social question from another point of view than that from which it is usually approached.—*The Phila. Med. Jour.*, March 26, 1898.

INTESTINAL ANTISEPTIC MIXTURE IN TYPHOID FEVER.

℞. Salol, ℥i
Thymol, gr. xxxvi
Bismuth. subnit., ℥ii–iv
Mucilag. acacia, ℥ii
Syr. tolutan, ℥iv

M.—Sig.: One teaspoonful three times daily.—*Med. News*, April 2, 1898.

FOR CHRONIC FOLLICULAR PHARYNGITIS

R.	Iodi pur.,	gr. iii
	Potass. iodid.,	gr. v
	Acid trichloracetici,	gr. vi
	Glycerini, } āā Aq. dest., }	℥ss

M.—Sig.: Apply by means of cotton applicator in full strength, or diluted, as may be indicated.—*Med. News*, April 2, 1898.

NEW COMPETITORS IN THE MEDICAL FIELD.

In spite of the vigilance and persistence practised by the medical profession in suppressing irregularities in its domain, some unexpected dragon is constantly protruding his obnoxious head. The latest surprise comes in the form of spiritualistic mediums, who are supplying prescriptions written by celebrated physicians, many of them long forgotten, who have left the terrestrial for the spirit world, but who, nevertheless, have not lost their interest in the practice of medicine.

A specific instance of this has recently occurred in England, and the question has arisen whether such prescriptions can be recognized and compounded by a legitimate chemist, and also who is to assume the responsibility of the effect of such prescriptions on the individuals taking them.—*Med. News*, March 19, 1898.

BRYONIN IN THE TREATMENT OF HEPATIC CONGESTION.

The *Gazette hebdomadaire de medicine et de chirurgie*, for February 3d, gives the following formula:

R.	Bryonin,	1½ grains.
	Sugar of milk,	60 "
	Gum arabic,	15 "
	Syrup,	q.s.

M.—Divide into a hundred granules. One to be taken every two hours, until the bowels are sufficiently moved.

MEDICAL ETIQUETTE IN CHINA.

Chinese doctors are said to be even more scrupulous than their white brother practitioners in regard to the nice points of professional etiquette. The following amusing tale is related in an English journal: "A Chinese gentleman was struck by an arrow, which remained fast in his body. A surgeon was sent for, and broke off the protruding bit of the arrow, leaving the point embedded. He refused to extract it, because the case was clearly one for a physician, the arrow being inside the body."—*Medical Record.*

AN OINTMENT FOR ACUTE ARTICULAR RHEUMATISM.

R.	Vaselin,	25 parts.
	Salicylic acid,	4 "
	Sodium salicylate,	3 "
	Extract of belladonna,	1 part.

M.—To be applied and covered with cotton.—*N. Y. Med. Jour.*, March 26 1898.

THE TEETH AND THE SOIL.

Examination of recruits in Bavaria and Sweden conducted on a large scale have confirmed the assumption that the richer the soil in lime and magnesia, the harder the drinking water, the more perfect the development of the teeth.—*Münch. Med. Woch.*, November 3, 1898.

A CHEMIC VACCINE FOR VIPERS' VENOM.

The above is announced to have been discovered by C. Phisalix, in tyrosin, found in certain plants, especially in the tuber of the dahlia and a mushroom. Two or three cubic centimeters of a hundredth solution will confer immunity to the venom upon a guinea-pig after twenty-four hours, lasting frequently for twenty-five days. It has no antitoxic power injected at the same time as the venom, nor any effect as an antidote, but merely acts as a chemic vaccine, the first known example of the cellular juice of a plant possessing immunizing properties in regard to snake poison. The immunizing action of the cholestrin of the bile, and also of the vegetable cholestrin found in the carrot by Arnaud, has already been noted by Phisalix. —*Presse Med.*, February 12, 1898.

IMMUNITY TO THE STING OF BEES.

Dr. Lauger, of Bohemia, stated at the recent Congress of German Naturalists and Physicians, that he found the majority of bee-keepers in his district (Ruschowan) acquire a complete immunity to the stings of those insects, while some seem to enjoy that immunity from the first possibly by inheritance. Of 153, 9 had always been insusceptible, 118 had acquired the immunity, 26 had not. In some cases it was so complete that, when intoxicated, men had been stung in from fifty to one hundred places with less suffering than is felt by most persons from flea bites. He found the poison to be an animal alkaloid, and not, as is commonly believed, formic acid. The best treatment is a subcutaneous injection of a 2

to 5 per cent. solution of potassium permanganate, as this salt in the proportion of one to twenty destroys this poison.—*The Practitioner*, February, 1898.

AN APPLICATION FOR DENTAL CARIES.

The *Gazette hebdomadaire de medicine et de chirurgie*, February 10th, attributes the following formula to Desnoyer:

℞. Crystallized carbolic acid, Essence of lemon, } each 2 parts.
Alcohol, 10 "

M.—The cavity is washed and dried, and a little pellet of cotton soaked in the solution is inserted. Over this another pellet of cotton charged with tincture benzoin is placed. The lemon is used simply to mask the odor of the carbolic acid.

RECENT LITERATURE RELATING TO PHARMACY.

FLUID EXTRACT OF LICORICE.

Peter Boa (*Pharmaceutical Journal*, February 26, 1898) in commenting upon the method of the British Pharmacopœia for the above preparation says that it is a process of double maceration with cold water, heating to boiling point, straining, evaporation to a specified gravity when cold, and preservation by spirit. Continuing, he says that two points deserve notice as being characteristic of this fluid extract. One is that it has to be evaporated so that, when cold, it shall have a specified gravity of 1·160; the other is that only one sixth of its volume of spirit has to be added, presumably to preserve it. In short, the object is to extract the sweet principle with water, which at the same time takes out albuminous and mucilaginous matter; to coagulate the albumen by heat and remove it by straining, and finally, for preservative purposes, to add the spirit which still further clears the extract by throwing down part of the mucilaginous matter.

In comparing the product made according to the above process with that made according to the U.S.P. method, he found the latter to compare very unfavorably with the former. It had an acid bitter flavor which quite overpowered the sweetness; while the B.P. extract possessed a sweet mellow taste, free from acidity and with only a faint bitterness. The bitterness of the U.S.P. extract was accounted for by the fact that licorice root contains, besides the sweet principle, an oleoresinous acrid principle and a bitter prin-

ciple, both of which are more soluble in alcohol than in water, and hence are extracted in larger proportion when alcohol is used.

With regard to the use of ammonia the author carried out experiments which seemed to indicate that it is not only unnecessary in the preparation of the fluid extract of licorice, but that it is distinctly objectionable. It alters the taste of the extract, but it does not appear to increase the sweetness.

Some improvements as to details for the B.P. process are suggested, the principal recommendation being that of percolation, instead of maceration and expression of the drug as now directed. The principal difficulty encountered in percolating the drug with water alone is that the percolate is liable to become acid before extraction is complete. The writer overcomes this objection, however, by adding just a sufficient quantity of ammonia water to the aqueous percolate to preserve its alkalinity while percolation is proceeding, which results in a loss of glycyrrhizin. In other words, he does not use ammonia in extracting the sweetness of the drug, but in preserving the sweetness of the extract.

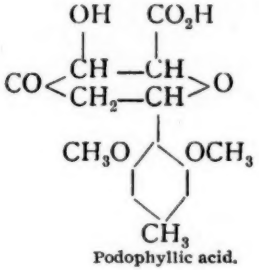
Finally, in summarizing his views of the subject, he says that water is the best menstruum for extracting the sweetness of licorice; if percolation of a rougher powder were substituted for double maceration and expression of the root in No. 20 powder, as directed by the B.P. formula, the process would be a more skillful one; ammonia might judiciously be employed as indicated to prevent loss of sweetness; and that a slight increase in the amount of alcohol would insure preservation and produce a cleaner extract.

A CHEMICAL EXAMINATION OF THE CONSTITUENTS OF INDIAN AND AMERICAN PODOPHYLLUM.

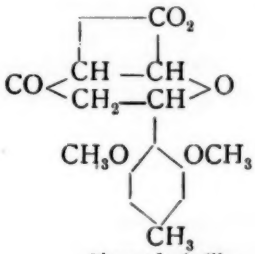
W. R. Dunstan and T. A. Henry (*Proceedings of the Chemical Society*, London, March, 1898), find that the constituents of Indian podophyllum (*Podophyllum emodi*) and of American podophyllum (*Podophyllum peltatum*) are identical. The chief constituent is the *podophyllotoxin* of Podwyssozki and Kürsten which the authors have fully examined. It is a neutral crystalline substance (melting point 117°) to which the authors assign the formula $C_{15}H_{14}O_6$. It is strongly lævorotatory, and acts as a powerful purgative and intestinal irritant. When heated with alkalies, it is converted by hydration into the salt of an unstable, gelatinous acid,

podophyllic acid, $C_{15}H_{16}O_7$, of which a crystalline sodium salt was obtained, and also silver and copper salts, which were analysed. This acid very readily loses water, and furnishes the crystalline *picropodophyllin* of Podwyssozki and Kürsten, which is isomeric with podophyllotoxin. It passes again into podophyllic acid when warmed with aqueous alkalis. It melts at 227°, and is optically inactive. Podophyllotoxin and picropodophyllin furnish identical decomposition products; when oxidised with nitric acid, *oxalic acid* is the principal product; when fused with alkalis, *orcinol* and *acetic acid* are produced. Both substances contain two methoxyl groups and no hydroxyl. It is concluded that picropodophyllin is the lactone of podophyllic acid, which is probably the hydroxy-carboxylic acid of *dimethoxymethyl-phenylhydro-γ-pyrone*.

The following formulæ are assigned to these compounds:



Podophyllic acid.



Picropodophyllin.

The nature of the isomerism of podophyllotoxin and picropodophyllin remains to be determined. The latter substance is therapeutically inert.

The yellow coloring matter of podophyllum, called by Podwyssozki podophylloquercetin, is proved by the authors to be identical with *quercetin*, the valuable yellow coloring matter of quercitron bark.

An uncrystallisable resin, *podophylloresin*, was also isolated and found to exert a purgative action.

Estimations have been made of the amount of "podophyllin" (a mixture of resins with podophyllotoxin which is used in medicine) contained in the two plants. Indian podophyllum contains from 9 to 12 per cent., and American from 4 to 5 per cent. The two resins have been proved to be equally valuable therapeutic agents. The amount of crystalline podophyllotoxin in the Indian plant varies

from 2 to 5 per cent., whilst representative samples of the American rhizome were found to contain rather less than 1 per cent.

Indian podophyllum is likely to be valuable both as a drug and as a dye-stuff.

DISCUSSION.

Mr. E. J. Millard asked if Professor Dunstan had noticed and could account for the smaller solubility of the resin from *P. emodi.* This was specially marked in the presence of a small quantity of an alkali when it assumed a gelatinous consistency. Since attention had been drawn to this resin by Professor Dunstan, manufacturers had prepared it in considerable quantities, and it was known commercially as the less soluble variety.

Professor Dunstan said, in reply, that any difference that may be observed in the solubility and other properties of podophyllin resin prepared from Indian podophyllum and that prepared from American podophyllum was probably accounted for by the different proportions in which the constituents were mixed in the resins prepared from the two sources, and not by any difference in the constituents themselves.

KINO.

The conditions which regulate the price of kino and its sources are described by A. E. Bertie-Smith in the *Chemist and Druggist* for March 5th. He says:

The principal ports from which gum-kino is usually shipped are Alleppi and Calicut, and at these ports and at others, such as Tellicherry and Cochin, are settled some three or four old European firms who control the export trade. One or more of these firms have succeeded in getting into their hands the whole of the arrivals of gum-kino from up-country districts, with the result now so well known in the London drug market.

In 1889 and 1890, when I was in Bombay, my firm there were in receipt of regular shipments of kino from the Malabar ports. I enclose an original quotation and an invoice from the firm of Andrew & Co., of Allepey, from which you will see that in 1889 I made a purchase from them of gum-kino at 16*r.* 8*a.* per cwt., or less than 2½*a* (2½*d.*) per pound, which, indeed, is its full value at Bombay.

About 1891 I found none of the above-mentioned shippers in

Malabar could or would supply us, and when the price rose so much in London we wrote a letter to Messrs. Andrew & Co., accusing them of cornering the drug, which accusation they never troubled to deny. It was comparatively easy for this firm to get hold of all shipments of kino, they being agents of the British India Steam Navigation Company, running the only steamers, excepting those of the Asiatic Company, which called for cargo at the Malabar ports; and having to issue the bills of lading, they would know when any of the drug was for shipment. Occasionally, however, a "tramp" vessel loads cargo for New York or other United States ports, and this would probably account for kino reaching the London drug market *via* New York.

For some years after the great rise in price at the London drug auctions, kino could be obtained in small quantities in the Bombay drug bazaar at one-third of the advancing London rate, owing to the fact that a certain amount came up from Malabar to Bombay in bugalows (country sailing-boats) shipped by natives to natives, which consignments European houses would know nothing about.

Until the demand for kino ceases altogether, it will, no doubt, be much more profitable for the monopolists to buy all that comes to hand, shipping only a moiety and destroying the rest, than to ship the quantities formerly exported and sold for just what the London wholesale druggists cared to give at the drug auctions. The monopoly could probably be broken by calling the attention of the Government of India to the present condition of the kino market, for the Forest Department is always willing to advise collectors how to get a better price for produce.

ON OXYCANNABIN FROM INDIAN HEMP.

A study of the above substance is reported by W. R. Dunstan and T. A. Henry (*Proceedings of the Chemical Society*, London, March, 1898).

Oxycannabin is the name given by Bolas and Francis to a crystalline substance they obtained by acting on the pharmacopœial extract of Indian hemp with concentrated nitric acid (*Trans.*, 1869, **22**, 417; *Chem. News*, 1871, **24**, 77). They obtained it in the form of yellow needles, melting at 176°, and represented its composition by the formula $C_{20}H_{20}N_2O_7$. In the course of the examination of

the constituents of Indian hemp, the authors have prepared the substance in this way, and have also obtained it by the action of fuming nitric acid on the "cannabinol" isolated by Messrs. Wood, Spivey and Easterfield (*Trans.*, 1896, **69**, 544) from the "charas" or resin of Indian hemp.

When quite pure, oxycannabin crystallizes in colorless needles, melting at 182°; it is insoluble in water, but soluble in hot alcohol, crystallizing out on cooling. It sublimes when gently heated, and may be easily purified in this way. On combustion, the substance gives numbers agreeing with those required by the formula $C_{10}H_{10}NO_4$.

It does not dissolve in aqueous alkalis unless warmed with them in a closed tube. By acidifying the resulting solution an acid is precipitated, which is at present under investigation. "Oxycannabin" would, therefore, appear to be a lactone.

On reduction with hydriodic acid, or with tin and hydrochloric acid, oxycannabin furnishes a volatile amine. The hydrochloride of this base, though itself unstable, gives a well-crystallized platinichloride.

When heated with zinc dust, oxycannabin gives off a large amount of an inflammable gas (probably methane), and a quantity of an aromatic hydrocarbon is produced, which forms a well-crystallized compound with picric acid.

By the action of nitric acid on cannabinol, normal butyric acid was also produced, together with oxalic acid.

As the substance is thus proved to be a nitro-compound, the name "oxycannabin" is inappropriate, but it would be premature to propose a new name until more is known about the constitution of the compound.

In the course of purifying cannabinol through the acetyl derivative mentioned by Messrs. Wood, Spivey and Easterfield, the acetyl derivative was obtained in colorless crystals melting at 75°, and which corresponded in composition to the formula $C_{18}H_{23}AcO$.

The *dry distillation of sawdust* is, according to the British Consul at Christiana, one of the latest enterprises in Norway. The products are acetic acid, wood naptha (methyl alcohol) and tar. A factory has been started at Fredrikstad capable of distilling 10,000 tons of sawdust during the year, and also of manufacturing charcoal briquettes, which are exported to the Netherlands. The acids are chiefly placed on the German market, while the tar is mostly consumed at home.—*Journal of the Society of Chemical Industry*, January 31 1898.

EDITORIAL.

AMERICAN GINSENG.

The output of literature concerning the production of ginseng during the past month has been considerable. Bulletin No. 16 of the United States Department of Agriculture is the most important contribution, but two others in Consular Reports for April are of considerable interest; they are entitled "American Ginseng in China" and "Ginseng in Korea." It is interesting to note that both consuls call attention to the fact that the use of ginseng among the Chinese is almost entirely one of sentiment, yet every man, woman and child in China uses it not only as a cure for all kinds of diseases, but also as a preventive against dreaded ailments. It is evident that the American product cannot replace that from Korea, nor compare favorably with it in price, as the statistics for 1896 show importations through Chinese customs of 353,147 pounds, valued at $656,515 gold, or about $1.86 gold per pound, while the importations from Korea for the same period amounted to 14,987 pounds, valued at $247,137 gold, or $16.50 per pound. This is supposed to represent only about one-half the actual importation, as smuggling in this article is extensively carried on. Another consular statement is to the effect that the American ginseng readily finds sale at $3.00 to $3.50 per pound, and special pieces of the more desirable shapes might be sold at ten times that price. The Bulletin of the Agricultural Department details the commercial history and cultivation of ginseng. Already considerable tracts are under cultivation in this country, and it is evident that whatever future there is in this industry must come from the cultivated article.

SUCCESSFUL TEA GROWING IN AMERICA.

This is the title of a paper in the April number of the *Cosmopolitan Magazine*, and the author, Mr. LaFayette I. Parks, makes out a case which justifies the title. It appears that at present the only tea plantation in the United States is situated at Summerville, South Carolina, and is the property of Dr. Charles U. Shepard. Last season upward of 1100 pounds of the finest tea obtainable was marketed, and this year's crop will, he states, amount to more than 2,000 pounds. As long ago as 1877 the Department of Agriculture investigated the possibilities of raising tea in the United States, and "after thorough inspection of Mr. Shepard's tea plantation, Mr. Saunders made a very favorable report, predicting that it would only be a question of time when our farmers will supply sufficient tea for home consumption." Mr. Shepard calls attention to the fact that this undertaking is largely experimental in character; he believes the present indications promise that the venture will prove profitable, although the object in view is only in part industrial. One of the chief commercial difficulties is the relatively high price of labor in the United States compared with that in the countries in which tea is produced at present.

The product has been declared to be equal to any sent to the United States from the Orient. All that has been offered has always found a ready sale. Two photographic reproductions accompany the paper, illustrating the process of picking the leaves, and a field of the plants two years old raised from seeds.

Almost exactly in contradiction to the foregoing, is a statement in the *Chemist and Druggist* for April 2, which asserts that "tea planting in the United States is at present a failure." No authority for this sweeping state-

ment is given, and, since no claim is made that the industry has advanced beyond the experimental stage, and the experiment is still in progress, it is difficult to see how it can be designated a failure.

GEORG DRAGENDORFF.

The death of this well-known scientist occurred on the 7th of April, at his home in Rostock, Germany. He was born on the 20th of April, 1836. A more extended sketch will be published in a future number of this journal.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

MISSOURI BOTANICAL GARDEN'S NINTH ANNUAL REPORT. William Trelease, Director, St. Louis, Mo., 1898. The ninth annnal report covers the year 1897, and contains the reports of the Board of Trustees and of the Director; these, however, occupy but twenty of the 160 pages, the balance being devoted to scientific papers. These papers are illustrated by 150 plates, and several handsome photographic reproductions are interspersed through the other portion of the book. All the scientific papers are interesting, but the attention may especially be called to: "A Revision of the Genus Capsicum with especial Reference to Garden Varieties," by H. C. Irish; "Miscellaneous Notes on Yuccas" by W. Trelease; "The Missouri Dogbanes," by W. Trelease, and "A Coloring Matter found in Borraginaceæ," by J. B. S. Norton. The whole book is fully up to the high standard of its predecessors.

ANNUAL AND ANALYTICAL CYCLOPÆDIA OF PRACTICAL MEDICINE. By Charles E. deM. Sajous, M.D., and one hundred associate editors. Volume I. The F. A. Davis Company, publishers, Philadelphia, New York and Chicago, 1898.

THE ANNUAL OF THE UNIVERSAL MEDICAL SCIENCES, consisting of five volumes, was first issued ten years ago; it has always met with a warm welcome, but has come to be considered too bulky for the modern busy physician; therefore, the present work, which will probably consist of six volumes of 600 pages each, will replace it. In this first volume there is an immense amount of valuable medical and pharmaceutical literature condensed into a small space. The titles extend alphabetically from Abdomen to Bright's Disease.

The editor deserves great credit for the able manner in which he has performed his duties. Notwithstanding the fact that he has had the assistance of so many able associates, the detail work, arranging, and the bulk of the abstracting has been done by himself. The illustrations are numerous and have been well executed.

REPORT OF PROCEEDINGS OF THE ILLINOIS PHARMACEUTICAL ASSOCIATION, at its Eighteenth Annual Meeting, held at Champaign, June 2–3, 1897.

In addition to the committee work of the Association, the following papers were presented: "Emergencies, How to Treat Them," by W. H. Garrison, and "An Examination of Some Chemicals of Commerce," and "A Microscopic Examination of Some Powdered Drugs of the Market," by the School of Pharmacy of the University of Illinois.

ÉLOGE DE M. CAVENTOU, lu a l'Académie de Médecine, dans la Séance annuelle du 14 Décembre, 1897. Par M. J. Bergeron, Secrétaire Perpétuel de l'Académie. Masson et Cie, Éditeurs. Paris. 1897.

Until this octavo pamphlet of twenty-five pages appeared, the literature concerning Caventou was quite meagre; now, however, we have a full record of this remarkable man. Both Pelletier and Caventou began professional life as pharmacists, and were closely associated with that calling during their lives. Their combined discoveries have been of the greatest value to mankind, and individually Caventou made a number of the discoveries of great practical and scientific interest.

ON THE CINNAMOMUMS OF NEW SOUTH WALES; WITH A SPECIAL RESEARCH ON THE OIL OF C. OLIVERI, BAIL. By R. T. Baker, F.L.S. From the *Proc. of the Linnean Society* of New South Wales, July 28, 1898.

Prior to the publication of this paper there appears to be no record of the occurrence in the colony of New South Wales of any indigenous representative the genus Cinnamomum; now, there are shown to be at least two species, viz., C. oliveri, Bail, and C. virens, sp. nov. The bark of the former yields about 1 per cent. of a very fragrant oil.

ON THE SACCHARINE AND ASTRINGENT EXUDATIONS OF THE GREY GUM, EUCALYPTUS PUNCTATA, D. C., AND ON A PRODUCT ALLIED TO AROMADENDRIN. By Henry G. Smith, F.C.S. From the *Proc. of the Royal Society of New South Wales*, August 4, 1897. This publication will receive attention in a future number of the JOURNAL.

CONTRIBUTION TO A KNOWLEDGE OF THE FLORA OF AUSTRALIA, No. I. By R. T. Baker, F.L.S. From the *Proc. of the Linnean Society of New South Wales*, June 30, 1897.

MEDICINISCHE NOTIZEN AUS JAPAN. Von Prof. Dr. O. Loew. From *Münchener med. Wochenschrift*, No. 12, 1898.

This contains an account of the climate of Japan, which is shown not to be so delightful as represented.

SUR LES PROPRIÉTÉS TOXIQUES DU DIPLOTAXIS ERUCOIDES, D. C. Par Docteur Louis Planchon. Montpellier, 1898.

DIE HEILPFLANZEN DER VERSCHIEDENEN VÖLKER UND ZEITEN. Von Dr. med. et. phil. Georg Dragendorff. Lieferungen 1 und 2. Verlag Von Ferdinand Enke, Stuttgart, 1898. Two parts, amounting to some 300 pages, of this work have been received, but no adequate idea of the whole can be found until nearer completion; then a complete review will be published.

AMERICAN GINSENG; ITS COMMERCIAL HISTORY, PROTECTION AND CULTIVATION. By George V. Nash. Revised and extended by Maurice G. Kains. Bulletin No. 16, U. S. Department of Agriculture, Division of Botany, Washington, D. C., 1898.

This is a revised edition of the Bulletin on the same subject published in 1895. Considerable progress has been made in the cultivation of the root in three years, and the cultivated root has brought as high as $6 per pound, or $1 to $1.50 higher than the wild root.

PHILADELPHIA COLLEGE OF PHARMACY.

The following are the questions given to the Third Year Class at the recent examinations:

THEORY AND PRACTICE OF PHARMACY.

A—(1) How many grammes of Massa Hydrargyri will be required to make 144 five-grain blue pills? (2) How much mercury would there be in the whole quantity? (3) How would you take the specific gravity of a five-grain blue pill? (4) What would be the object or purpose of taking the specific gravity of blue mass?

B—Give the synonym, unabbreviated official or Latin name, ingredients, brief outline of process and describe the appearance of Infusion of Cinchona, Spirit of Gaultheria, Flexible Collodion, Aromatic Tincture of Rhubarb, Fluid Extract of Senega, Confection of Senna, Vallet's Mass, Solidified Copaiba.

C—Give the official name, English name, ingredients, brief outline of process, and describe the appearance of Bismuthi et Ammonii Citras, Liquor Potassii Arsenitis, Infusum Digitalis, Syrupus Scillæ Compositus, Pilulæ Catharticæ Compositæ, Pulvis Aromaticus, Unguentum Potassii Iodidi.

D—What pharmaceutical difficulties would you encounter in making the following preparations, stating the cause of the difficulty? How should the preparations be made? and why? (1) Fluid Extract of Calumba, with 20 per cent. of alcohol and calumba in very fine powder. (2) Ointment of Mercuric Nitrate if lard oil is furnished of common quality containing paraffin oil. (3) Solution of Ferric Sulphate with nitric acid of specific gravity 1.25. (4) Ointment of Zinc Oxide, with commercial oxide of zinc of the cheapest grade.

E—(1) What menstruum is best adapted for exhausting aconite root? (2) What alkaloid does this root contain? (3) What acids are found naturally in the root? (4) What physiological action do aconite preparations exhibit when taken into the stomach? (5) Describe and illustrate (by a sketch) a stomach-pump; what is its aim and purpose? explain its method of use.

MAGISTRAL PHARMACY.

F—Define Chemical, Physical, and Therapeutical Incompatibility, and write three prescriptions, giving correct metric doses, illustrating each kind of incompatibility. (1) Chemical Incompatibility. (2) Physical Incompatibility. (3) Therapeutical Incompatibility.

G—(1) In compounding prescriptions, state under what circumstances it is advantageous to aid the solution of a solid by heating it with the solvent. (2) State when it is proper to filter a prescribed liquid preparation, and explain why, for certain reasons, filtration sometimes should not be resorted to. (3) When is it permissible to make an addition to a prescription without the consent of the prescriber? Give reasons for your answer. (4) Is it desirable, when renewing a prescription, to follow the order of mixing the ingredients originally used? If so, why?

H—(1) What is meant by compressed tablets? (2) Describe their method of manufacture. (3) Are all medicinal powders compressible without admixture with foreign substances? If not, explain why. (4) What is a pill-excipient? (5) Name five pill-excipients, and give five illustrations of official pills for which each would be well adapted.

I—Criticise the following prescriptions, stating whether you would compound them as written. If not, why not? How would you proceed if such were presented to be filled?

℞	Plumbi Acet.	gr. xi
	Bismuth Subnit.	ʒjs
	Acid Sulph. Arom.	fʒjs
	Quiniæ Sulph.	gr. xx
	Aquæ Anisi	ad. fʒiv

Sig.—A teaspoonful three times a day.—DR. BROWN.

℞	Ext. Secale Cornut., Fld.	fʒi
	Vin. Ejusdem	fʒi
	Sacch. Alb.	ʒjs

Sig.—One teaspoonful every two or four hours as needed.—DR. LOWE.

℞	Potassii. Iodid.	ʒiijs
	Hydrarg. Bichlor.	gr. xx
	Alcohol	fʒjs
	Tr. Cinch. Comp.	fʒiiijs

Sig.—A teaspoonful three times a day.—DR. SMITH.

PHARMACY LAWS.

K—(1) In what State have you practised or studied pharmacy? (2) Give briefly the essential features of the pharmacy law of such State. (3) Should a pharmacy law protect the pharmacist or the public? Give reasons. (4) What are the advantages of a law compelling apprentices to register after examination? (5) How, in your opinion, should Boards of Pharmacy be appointed?

CHEMISTRY.

A—(1) Give the general formula for the series of saturated hydro-carbons. (2) By what chemical reactions can you distinguish unsaturated hydro-carbons from saturated? (3) State the occurrence in nature and the artificial production of both classes. (4) Is the benzene series a saturated or an unsaturated series? Show this by the graphic formula.

B—(1) Give the distinction between primary and secondary alcohols, using graphic formulas. (2) How are each of these classes respectively affected by oxidation? (3) Illustrate by the case of primary and secondary propyl alcohols, naming the products obtained.

C—(1) Upon what does the basicity of an organic acid depend? (2) Write the graphic formulas of *acidum aceticum*, *acidum tartaricum*, *acidum lacticum*, *acidum benzoicum*, *oxalic acid* and *formic acids*, and state the basicity of each. (3) What is meant by the term "unsaturated acid?" (4) What is "phenol-acid?"

D—(1) What is meant by an Ester? (2) Give an example of an ester of an inorganic acid. Of an organic acid. (3) What is meant by saponifying an ester? Write a reaction in illustration of this process. (4) Name some official ester of the fatty acids. Some official esters of aromatic acids.

E—(1) What is an *Enzyme?* (2) Write some reactions brought about by the action of enzymes. (3) State the conditions most favorable for the alco-

holic fermentation. (4)What are the important differences in the condition needed for the acetic and lactic fermentations?

F—(1) Describe Phenol and give its official name and ordinary source. (2) How can it be made artificially from benzene? (3) Give the most characteristic pharmaceutical tests for identity. (4) How is "phenacetin" related to Phenol?

G—(1) Describe Benzaldehyde and give its official name and earliest source. (2) How can it be made artificially from benzene? (3) Give the most characteristic pharmacopœial tests for its identity. (4) Give the name and formula for the corresponding phenol-aldehyde.

H—(1) Please give an outline of the method of examination for poisons in a mixture of unknown composition. (2) Mention the most important of alkaloidal reagents.

I—(1) How would you proceed in a case of suspected arsenic poisoning? (2) What are the tests which enable one to distinguish arsenic from antimony? (3) What is the best antidote in cases of arsenic poisoning, and how is it prepared?

K—(1) State the important determinations to be made in the analysis of a potable water? (2) What is the meaning of the term "albuminoid ammonia," and what does its relative amount in a water indicate? (3) How are the determinations of "free ammonia" and "albuminoid ammonia" made?

MATERIA MEDICA.

A—Opium.—(1) Give the botanical origin, natural order and habitat. (2) State the manner of collection. (3) What adulterations are sometimes present? (4) Briefly outline Hager's test for adulterations. (5) Name a physiological antagonist. (6) Give the maximum doses of opium, morphine and codeine.

B—Asafœtida.—(1) Give the botanical origin, natural order and habitat. (2) State the manner of collection. (3) Name the varieties. (4) What per cent. of resin should it yield? (5) What is the color test for it? (6) What adulterations are often present? (7) Name its constituents. (8) State its medicinal properties and dose.

C—Natural Order Leguminosæ.—(1) Name two official balsams yielded by plants belonging to this order. (2) State the manner of their collection. (3) Name an official oleoresin obtained from South America. (4) Name three commercial varieties of it. (5) Give official name, botanical origin and habitat of a gum which is a degradation product of the cells of the pith and medullary rays. (6) Name two official extracts or inspissated juices. (6) Which one of these tinges the saliva a deep red?

D—Animal Drugs.—(1) Name ten official drugs of animal origin, and the animals from which they are obtained. (2) Which of them is a vesicant? (3) Which of them is powerfully odorous? (4) Which of them yields a coloring principle? (5) Which are used in ointments? (6) Which are enzymes? (7) Which is used as a protective?

PHYSIOLOGY.

E—Bones and Articulation.—(1) Describe briefly the structure of bone. (2) Locate the femur. (3) With what bones does it articulate? (4) Name the kind of joints by which it is articulated. (5) Locate the hyoid bone. (6) What important organ is joined to it by its base? (7) Name the first and second vertebra. (8) How are the movements of nodding and rotating the head accomplished?

F—Digestion.—(1) Name the seven stages. (2) Name the different ferment principles which act during digestion, the organs by which they are secreted, and the functions of each. (3) What is the difference between chyme and chyle? What are the uses of valvulæ conniventes?

G—The Eye.—(1) Name the three coats, and state the functions of the inner one. (2) Name the refracting media. (3) What are the functions of the iris? (4) Name two mydriatic drugs. (5) Name two myotic drugs. (6) What defect exists in myopic eyes? (7) What defect exists in hypermetropic eyes?

PHYSIOLOGICAL ACTION OF DRUGS.

H—Antiseptics, Anthelmintics, etc.—(1) State the meaning of the terms, Aseptic, Antizymotic, Antiseptic and Germicide. (2) Give an illustration of each. (3) Name an anthelmintic flower drug, fruit drug and rhizomic drug. (4) Name a tænifuge bark drug, rhizome drug, and seed drug. (5) Name two topical sialagogues and two general or systemic sialagogues. (6) Name an antisialagogue.

I—Emetics, Purgatives, etc.—(1) Name two local or direct emetics, and two general or systemic emetics. (2) Name two antiemetics. (3) Name a drug which increases and one which decreases peristalsis. (4) Name a simple laxative and a drastic purgative. (5) Name two saline cathartics. (6) Name two cholagogue purgatives. (7) Name an intestinal astringent.

K—Drugs Acting upon the Blood, Heart, etc.—(1) Name three drugs which alkalize the blood. (2) Name two hæmatinic drugs. (3) Name two which are hæmostatics. (4) Name a vesicant, a pustulant and an escharotic. (5) What effect does carbon monoxide have upon the hæmoglobin of the blood? Give also that produced by large doses of antipyrin. (6) Name two cardiac tonics which increase the force of the heart's contraction, and decrease the number of beats. (7) Name two cardiac sedatives which lessen the force and frequency of the heart's action.

COMMITTEE.

A—Lead.—(1) Give Latin name, specific gravity, symbol and valence of Lead. (2) Name some of the localities from which it is obtained. (3) In what combination does Lead usually exist in nature? (4) What process is generally used in separating it from this combination? (5) Name three compounds formed by Lead with oxygen, giving their symbols. (6) What is the most important soluble salt of Lead? (7) Write the chemical formula and give the official name of White Lead. (8) Outline the process for "Goulard's Extract," name the salt and percentage of it contained in the extract. (9) Give two tests for the compounds of Lead. (10) Name two official preparations containing Goulard's Extract and give the ingredients of each.

B—(1) What are Alkaloids chemically? (2) What elements do they all contain? (3) How do volatile alkaloids differ physically from non-volatile alkaloids? How do they differ chemically? (4) How do Alkaloids differ from their salts as to solubility in water? (5) Mention one or more reagents by which Alkaloids are precipitated from their solutions. (6) What termination does the official nomenclature of Alkaloids require? In English? In Latin? (7) Name three (3) official drugs yielding Alkaloids. (8) Name the Alkaloid obtained from each of these drugs. (9) Give the dose of each. (10) Name two Alkaloids classed as mydriatics.

C—(1) What is the botanical name, natural order and habitat of the plant yielding Glycyrrhiza? (2) To what principle does Glycyrrhiza owe its sweetness? (3) What addition to the ordinary solvents is usually made when extracting Glycyrrhiza? Why is this addition made? (4) How would you distinguish certainly whether Russian or Spanish Licorice had been used in the preparation of Pulvis Glycyrrhizæ Compositus? (5) How would you distinguish in a sample of powdered senna whether it was made from the Alexandrian or Indian leaves?

D—(1) The U. S. Pharmacopœia mentions twenty-five preparations called "Spirits." How are they chiefly prepared? (2) Mention one made by chemical reaction. (3) What are their ordinary uses in medicine? (4) Mention five Spirits, giving the official, the English and the common name, if any. (5) Give the mode of preparation, and maximum dose of each of those named.

E—(1) Define Specific Gravity. (2) What is Specific Volume? (3) A piece of Iron weighing 840 grammes is put into a counterpoised beaker, which is then filled with water up to a certain mark above the level of the Iron. The whole is found to weigh 1,280 grammes. The iron is then taken out and water again poured in until the beaker is filled up to the same mark. It now weighs 560 grammes, find the Specific Gravity of the Iron and its weight when under water. (4) At what price per liter would it be necessary to sell official Glycerin, costing 32 cents per kilogramme, to realize 50 per cent. profit on the transaction? (5) How many grammes of alcohol, specific gravity ·820, would a half liter measure hold?

F—(1) Define the term gravimetric analysis. (2) Define the term volumetric analysis. (3) What do the abbreviations T. S. and V. S. mean as used in the U. S. Pharmacopœia? (4) How are the several strengths of V. S. expressed? Give two examples. (5) What is an indicator? Name two indicators. (6) Give the most important solid constituents of normal urine, with their percentages. (7) What disease is indicated when sugar is present in urine? (8) Give two tests for the presence of sugar in urine? (9) What is the formula of urea? (10) Give an outline of the method of estimating it and write the reaction involved.

G—Give a concise description of the physical characteristics of the following, noting color, consistence, taste, odor, etc., of each: (1) Liquor Ferri Chloridi; (2) Acidum Hydrochloricum; (3) Tinctura Capsici; (4) Syrupus Ferri Iodidi; (5) Liquor Arsenii et Hydrargyri Iodidi; (6) Ferri Phosphas Solubilis; (7) Glycyrrhiza; (8) Mistura Ferri Composita; (9) Oleum Gossypii Seminis; (10) Argenti Oxidum.

H—Give the ordinary adult dose of each of the following substances. In case of poisoning by them give an antidote for each and state in each case whether the antidote is Chemical or Physiological: (1) Acid Arsenous; (2) Acid Oxalic; (3) Tartar Emetic; (4) Corrosive Mercuric Chloride; (5) Alcohol; (6) Tincture of Iodine; (7) Morphine Sulphate; (8) Strychnine Sulphate; (9) Acetate of Lead; (10) Atropine Sulphate.

I—(1) Criticise the following prescriptions; state whether you would dispense them as written; if not, why not? if you would, state the method:

℞ Potassii Chlor. ℥j
Tr. Guaiaci Ammon. f℥ss
Tr. Cinchon. Comp. f℥ii
Mel Despumat. f℥j
Aquæ q. s. ft. f℥iv
M.

(2) ℞ Tr. Nucis Vomic. ♏xl
Acid. Nitromuriatic f℥iii
Sig.—Ten drops after each meal.

State your mode of procedure in preparing the following prescription:

(3) ℞ Calcis Sulphuratæ ℥ss
Zinci Sulphas ℥ss
Aquæ
Aquæ Rosæ āā f℥ii
M.—Sec. art. et fit. mist.
S.—For external use.

K—(1) Write a prescription for a f℥iv Cough Mixture for an adult, using unabbreviated official names. Let it contain proper doses in each dessertspoonful of codeine sulphate, muriate of ammonia, bromide of ammonium, syrup of senega and brown mixture. Write such directions as you think proper, and place in a parallel column the approximate metrical equivalents of the quantities you use.

(2) Describe in detail how you would compound the following prescription:

℞ Sulphur Præcipitat. ℥ii
Camphoræ gr. x
Tragacanth Pulv. gr. xx
Liq. Calcis
Aquæ Rosæ āā f℥ii
M. Sig.—Apply. Shake well.—DR. D.

The following specimens were placed before the members of the class for recognition during the several examinations:

Pharmacy.

(1) Aqua fœniculi,
(2) Infusum digitalis,
(3) Spiritus ætheris nitrosi,
(4) Syrupus zingiberis,
(5) Adeps benzoinatus,
(6) Pulvis glycyrrhizæ compositus,
(7) Pulvis ipecacuanhæ et opii,
(8) Linimentum chloroformi,
(9) Tinctura aurantii amari,
(10) Extractum gentianæ fluidum.

Chemistry.

(1) Benzinum,
(2) Acidum stearicum,
(3) Magnesii carbonas,
(4) Acetanilidum,
(5) Sodii acetas,
(6) Potassii ferrocyanidum,
(7) Sodii hyposulphis,
(8) Sodii bicarbonas,
(9) Acidum benzoicum,
(10) Aqua chlori.

Materia Medica.

(1) Aconitum,
(2) Digitalis,

Committee.

(1) Aqua chloroformi,
(2) Syrupus acidi hydriodici,

(3) Strophanthus,
(4) Gentiana,
(5) Mentha piperita,
(6) Veratrum viride,
(7) Coca,
(8) Chirata,
(9) Arnicæ flores,
(10) Chenopodium.

(3) Tinctura cardamomi composita,
(4) Extractum ergotæ fluidum,
(5) Antimonii sulphidum,
(6) Acidum benzoicum,
(7) Ammonii chloridum,
(8) Pyrethrum,
(9) Gossypii radicis cortex,
(10) Pilocarpus.

OPERATIVE PHARMACY.

(1) *Alcoholmetrical Test.*

Estimate the amount of Alcohol in the sample of White Wine; put all calculations on the sheet of paper, with your name and examination number, and put clearly on the paper the letter of the sample estimated.

(2) *Emulsion.*

Make 100 c.c. of an Emulsion which shall contain 50 per cent. of Cod Liver Oil, by the *English method;* put in a bottle and place a label on the bottle, giving the proportions of each ingredient.

(3) *Pills.*

Ferrous Sulphate	4	gm.
Potassium Carbonate	2	gm.
Sugar, Powd.	1	gm.
Tragacanth	·25	gm.
Althæa, Powd.	·25	gm.
Glycerin		
Water	āā . 3	drops.

Make 25 pills; coat with silver.

N. B.—The silver leaf will be found in the pill-box.

(4) *Suppositories.*

Extract of Stramonium Leaves	·50	gm.
Tannic Acid	·50	gm.
Oil of Theobroma	6	gm.

Make six suppositories, by rolling.

(5) *Plaster.*

Spread a warming plaster (shaped, with round corners), about 4 x 6 inches of plaster surface.

The plaster will be found in the tin dipper.

QUANTITATIVE ANALYSIS.

For the purposes of this examination the class was divided into four sections. The following are the questions presented to one section:

(1) Prepare a liter of decinormal oxalic acid volumetric solution. Why do you employ 6·285 grammes of oxalic acid?

(2) Determine the number of grammes of potassium hydrate contained in 10 c.c. of the potassium hydrate solution on your table.

(3) Determine the number of grammes of sodium hydrate contained in 10 c.c. of the sodium hydrate solution on your table.

(4) What are the reactions which take place in these estimations?

(5) Why is each c.c. of the decinormal oxalic acid volumetric solution equal to the equivalent of sodium hydrate given in your book?

(6) How much normal oxalic acid volumetric solution should be needed to neutralize 27·995 grammes of liquor potassæ containing 5 per cent of potassium hydrate?

(7) How much metallic iron does one gramme of ferric oxide represent?

(8) How much crystallized ferrous sulphate is required to yield 2·5 grammes of ferric oxide?

SEVENTY-SEVENTH ANNUAL COMMENCEMENT.

The exercises connected with conferring the degree of Doctor in Pharmacy and Pharmaceutical Chemist were held at the Academy of Music, Thursday evening, April 14th, at 8 o'clock.

Prayer was offered by Rev. Mervin J. Eckels, D.D.

The degrees were conferred by Charles Bullock, President of the College.

The following received the degree of Doctor in Pharmacy:

Name.	*Subject of Thesis.*	*State.*
Abrams, Frederick Arthur,	*Glycerin*,	Pennsylvania.
Baer, Lemuel Miles,	*Liquor Potassæ*,	Pennsylvania.
Berberich, Herman,	*Piscidia Erythrina*,	Germany.
Berry, Robert Taylor,	*Acidum Aceticum, U.S.P.*,	W. Virginia.
Beyerle, Chas. Wellington,	*Aromatic Sulphuric Acid*,	Pennsylvania.
Bishop, David Kirlin,	*Dilute Hydrobromic Acid*,	Pennsylvania.
Black, Robert Morris,	*Potassium Bromide*,	Pennsylvania.
Booth, Thomas,	*Phenylacetamide*,	Pennsylvania.
Brach, Cornelius,	*Honey*,	Germany.
Bradford, Edward Burton,	*Digitalis*,	New Jersey.
Bready, Wm. Ramsey, Jr.,	*Lactic Acid*,	Pennsylvania.
Brewton, Swain Hoffman,	*Acidum Hydrochloricum Dilutum*,	New Jersey.
Coleman, John Edward,	*Acidum Sulphurosum*,	Pennsylvania.
Cooper, Walter Greenlee,	*Calx Chlorata*,	Missouri.
Cox, Linwood,	*Phytolacca Decandra*,	Pennsylvania.
Dale, David,	*Granulation of Powders for Compressed Pills*,	Pennsylvania.
Decker, Wm. Robert,	*Aqua Hydrogenii Dioxidi*,	Pennsylvania.
Dirmitt, Chas. Walter,	*Quantitative Estimation of Starch*,	Pennsylvania
Dubell, Alexander,	*Dilute Nitro-Hydrochloric Acid*,	New Jersey.
Eastlack, Walter Forrest,	*Cocaine and the Erythroxylon Coca Plant*,	Pennsylvania.
Evans, Abner Thomas,	*Labarraque's Solution*,	Pennsylvania.
Evans, Samuel, Jr.,	*Solution of Ferric Chloride*,	Ohio.
Farrow, Fred. Reeves,	*The Future of American Pharmacy*,	Delaware.
Fisher, Samuel Keim,	*Preservation of Syrup of Ferrous Iodide*,	Pennsylvania.
Friebely, Harry Eugene,	*Tinctura Ferri Chloridi*,	Pennsylvania.
Funk, Robert Rowland,	*Unguentum Aquæ Rosæ*.	Maryland.
Gladhill, James White,	*Castanea Dentata*,	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
Groff, Harry Musselman,	*Ananassa Sativa,*	Pennsylvania.
Grunden, Percival Edward,	*Aqua Chlori, U.S.P.,*	Pennsylvania.
Guth, Herbert Wallace,	*Urine Analysis,*	Pennsylvania.
Haus, Ralph Leonard,	*Dilute Hypophosphorus Acid,*	Pennsylvania.
Heintzelman, Jos. August, Jr.,	*Syrup of Ferrous Iodide,*	Pennsylvania.
Heverly, Fred. Chase,	*Rhus Toxicodendron, U.S.P.,*	Pennsylvania.
Hoffman, Wm. Anton,	*Stramonium,*	Pennsylvania.
Huntington, Joseph,	*Seidlitz Powders*	Pennsylvania.
Jenkins, Frank Heiston,	*Liquor Potassii Arseniti,*	Pennsylvania.
Kain, John Kauffman,	*Podophyllum,*	Pennsylvania.
Keen, George Carll,	*Fluid Extract of Buchu,*	New Jersey.
Keenan, John Joseph,	*Examination of Official Nitric Acid,*	Pennsylvania.
Keim, Joseph Paxson,	*Chlorophyll,*	Pennsylvania.
Kepner, Weldon Stover,	*Guarana,*	Pennsylvania.
King, James David,	*Spiritus Ætheris Nitrosi*	Pennsylvania.
Kirby, Frank Brennand,	*Acidum Tartaricum,*	Pennsylvania.
Krewson, Wm. Egbert, Jr.,	*Larrea Mexicana,*	Pennsylvania.
Latchford, Orwan Luther,	*Acidum Aceticum*	Pennsylvania.
Lee, Walter Evan,	*Coca,*	New Jersey.
Lindig, Charles Warren,	*Scaled Salts, U.S.P.*	Pennsylvania.
Luebert, August Gustav,	*Hydrangea Paniculata var. Grandiflora,*	Pennsylvania.
McCleary, Harry Walter,	*The Successful Pharmacist,*	Pennsylvania.
Metzler, Walter Scott,	*Ipecacuanha,*	Ohio.
Middleton, Claude Ruoff,	*Acidum Hydrocyanicum Dilutum,*	Pennsylvania.
Mills, John Leopold,	*The Druggist and His Time,*	Ohio.
Monaghan, Thos. Francis,	*Vegetable Dissemination,*	Pennsylvania.
Morell, Charles Joseph,	*Syrupus Acidi Hydriodici,*	Pennsylvania.
Morgan, Frank Wm.,	*Cotton Root Bark,*	Louisiana.
Mountain, Lloyd Lott,	*Progress of Pharmacy in America,*	Pennsylvania.
Parse, Andrew Connet,	*Glycerinum,*	New Jersey.
Preston, Gilbert Kent,	*A Species of Commelina,*	Pennsylvania.
Putt, Milton Thomas,	*Cinchona Bark,*	Pennsylvania.
Raker, John Wilson,	*Camphor,*	Pennsylvania.
Richardson, James,	*Tinctura Iodi,*	Ontario, Can.
Ringer, Louis Johnson,	*Fresh Emulsion of Cod Liver Oil,*	Maryland.
Rinker, Henry Paul,	*Liquor Potassæ.*	Pennsylvania.
Ritz, Charles August,	*Potassii et Sodii Tartras,*	Pennsylvania.
Rose, Frank, A. B.,	*Gallic Acid,*	Pennsylvania.
Ross, Annie Catherine,	*Animal Substances,*	Pennsylvania.
Schlauch, Theodore Storb,	*Acidum Phosphoricum Dilutum,*	Pennsylvania.
Seiberling, Joseph Dallas,	*Structure of Gelsemium,*	Pennsylvania.
Sheitz, Lloyd A.,	*Nux Vomica,*	Pennsylvania.
Shemp, Russell Nicholas,	*Althæa,*	Pennsylvania.
Sieber, Isaac Grafton,	*Iron,*	Pennsylvania.
Slobodkin, Rose,	*Syrupus Ferri Iodidi,*	Russia.
Smith, Benjamin James,	*Opium and its Preparations,*	New Jersey.
Snavely, Clarence Osborne,	*Thymol Sulphonic Acid,*	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
Snyder, John Paul,	*Tincture of Ginger*,	Pennsylvania.
Steinmetz, William Baer,	*Emulsions*,	Pennsylvania.
Stimus, Howard George,	*Honey*,	New Jersey.
Strawinski, Jacob Franklin,	*A Pharmaceutical Sieve*,	Pennsylvania.
Swartley, Harry Mahlon,	*Moschus*,	Pennsylvania.
Thompson, Henry Merrill,	*Sodii Bicarbonas*,	Pennsylvania.
Tomlinson, George Walton,	*Liquor Sodæ*,	Pennsylvania.
Troth, Ernest Augustine,	*Sulphuric Acid*,	New Jersey.
Waldner, Herman Theodore,	*Mistura Glycyrrhiza Composita*,	Pennsylvania.
Walter, William Bell,	*The Collodions*,	Pennsylvania.
Wilt, Geo. Washington, Jr.,	*Ammonia Water*,	Kentucky.
Winkler, Oscar Charles,	*Poisons of the U.S.P.*,	Pennsylvania.
Winslow, John Hayes,	*Nutgall*,	New Jersey.

The following received the degree of Pharmaceutical Chemist:

Name.	*Subject of Thesis.*	*State.*
Albert, Henry Clay,	*Lime Water and Lime Water Tablets*,	Kentucky.
Beane, George Ridenour,	*Menthol*,	Pennsylvania.
De Haven, Ida Valeria,	*Digestive Ferments*,	New Jersey.
Greer, Mary Caroline,	*Stramonium*,	Pennsylvania.
Kyser, George Herbert,	*Gossypium*,	Alabama.
Mathers, Grace,	*Colchicum*,	Pennsylvania.
Monroe, William Robeson,	*Aralia Californica*,	California.
Shwab, George Augustus,	*The Mexican Ava*,	Tennessee.
Thompson, Henry Kirk,	*Vallet's Mass*,	Pennsylvania.
Underwood, James Harris,	*Calomel*,	New Jersey.

The following received the degree of Graduate in Pharmacy:

Name.	*Subject of Thesis.*	*State.*
Brookes, Lulu,	*Kola*,	Texas.
Fleming, John Halbert,	*Adulterations*,	Pennsylvania.
Jacoby, William Lawless,	*Oleum Ricini*,	Pennsylvania.
Koehler, George,	*Lard*,	Pennsylvania.
Konover, Harold Doble,	*Artificial Light*,	New Jersey.
Lincoln, George Washington,	*Glycerin*,	Pennsylvania.
Pasold, Julius Martin,	*Calcium*,	Illinois.
Toelke, Charles,	*Disinfectants*,	Pennsylvania.
Weiss, Hervey Beale,	*A Cold Cream Apparatus*,	Pennsylvania.
Yates, John Julius,	*Class of Algae*,	Delaware.

Special certificates for a two years' course in general, applied and analytical chemistry were awarded to:

Cheney, Millwood C., New York.
Dirmitt, Charles Walter, Pennsylvania.
Heckeroth, William Conard, Pennsylvania.
Matusow, Harry, Ph.G., Russia.
Post, Edward Meigs, Ph.G., New Jersey.
Rowe, William C., Ph.G., Pennsylvania.
Suhr, Charles Louis, Pennsylvania.

STATES AND COUNTRIES REPRESENTED BY THE GRADUATING CLASSES.

Alabama	1	Maryland	2	Russia	2
California	1	Missouri	1	Tennessee	1
Delaware	2	New Jersey	14	Texas	1
Germany	2	New York	1	West Virginia	1
Illinois	1	Ohio	3		
Kentucky	2	Ontario	1	Total	114
Louisiana	1	Pennsylvania	77		

AWARD OF PRIZES.

The John M. Maisch Memorial Prize of a Zentmayer microscope, offered by the family of the late Prof. John M. Maisch, for original histological work on American plants, was awarded to Gilbert K. Preston. The following graduates received honorable mention in connection therewith: Frank W. Morgan and Joseph D. Seiberling.

The William B. Webb Memorial Prize, consisting of a gold medal and certificate, offered by Mrs. Rebecca T. Webb, for the highest general average in the examinations on committee, operative pharmacy and specimens, was awarded to James D. King, with honorable mention of Andrew C. Parse.

A Prize of a Gold Medal, offered by Prof. Joseph P. Remington, for an original device or contrivance useful in practical pharmaceutical work, was awarded to J. Franklin Strawinski.

The Chemical Prize of $25 in gold, offered by Prof. Samuel P. Sadtler, for knowledge of quantitative chemical analysis, was awarded to Joseph Huntington, with honorable mention of George A. Shwab.

The AMERICAN JOURNAL OF PHARMACY Prize of $25, offered by Prof. Henry Trimble, for a paper (not intended as a thesis) involving original work done in the Chemical Laboratory, was awarded to Charles W. Dirmitt.

The Materia Medica Prize of $25, offered by Prof. Clement B. Lowe, for the recognition of rare drugs by the aid of the simple microscope only, was awarded to Andrew C. Parse. The following graduates received honorable mention in connection therewith: David Dale, George A. Shwab, Fred. R. Farrow, and Jacob F. Strawinski.

The Maisch Prize of $20, offered by Mr J. H. Redsecker, of Lebanon, Pa., was awarded to J. Franklin Strawinski. The following graduates received honorable mention in connection therewith: David Dale, Fred. R. Farrow and Geo. A. Shwab.

The Operative Pharmacy Prize of $20 in gold, offered by Prof. Joseph P. Remington, for the best examination in operative pharmacy, was awarded to Theodore S. Schlauch. The following graduates received honorable mention in connection therewith: Robert T. Berry, John E. Coleman, Harry E. Friebely, Frank W. Morgan and James Richardson.

The Theoretical Pharmacy Prize of a fine Troemner agate prescription balance, offered by Mr. Mahlon N. Kline, of Philadelphia, was awarded to Joseph Huntington. The following graduates received honorable mention in connection therewith: Orwan L. Latchford, Andrew C. Parse and George A. Shwab.

The Robinson Chemical Prize, consisting of a gold medal and certificate, offered by Mr. James S. Robinson, of Memphis, Tenn., for the best exami-

nation in general and analytical chemistry, was awarded to Joseph Huntington.

The valedictory address to the graduating class was delivered by Prof. Samuel P. Sadtler.

The Professor's farewell supper to the graduates was given on Wednesday evening, April 13th, in the Museum of the College. The Officers and Trustees of the College were present, and also a number of invited guests. Prof. Remington was master of ceremonies, and the evening passed pleasantly in disposing of the menu, speech-making, etc.

MINUTES OF ANNUAL MEETING OF THE COLLEGE.

March 28, 1898.

The annual meeting of members of the College was held this day. Charles Bullock presided. The Secretary presented written resignations of three members. The Committee on Deceased Members reviewed the personal and business histories of Thomas J. Husband and Alfred B. Taylor, embodying in the same eulogistic remarks: That of Alfred B. Taylor was published in the April number of this JOURNAL, the other is as follows:

THOMAS J. HUSBAND.

Thomas J. Husband was born in Harford County, Md., in 1813. Coming to Philadelphia when a boy, he entered the drug store of Thomas McClintock, a well-known Philadelphia druggist, whose store was at the northwest corner of Fifth and Callowhill Streets. As an apprentice he gave abundant promise of future usefulness in his profession. He attended the Philadelphia College of Pharmacy, graduating with honor in the Class of 1833. He spent much time in working upon his thesis, the subject being: "Galipea Officinalis." This was published in the AMERICAN JOURNAL OF PHARMACY for October, 1833. He subsequently joined the College, becoming a life member, and for several years served on the Board of Trustees.

For more than fifty years he conducted a successful retail business at the northwest corner of Third and Spruce Streets, but his name is inseparably connected with the preparation known all over the country as "Husband's Magnesia." The enormous sale of this household remedy was due to his accurate knowledge of the physical properties of magnesia, and to the careful and judicious management which he exercised in putting it upon the market.

His qualities of mind, his education and training, and above all, his scrupulous honesty, had a great influence in establishing for more than one generation the continued demand for the magnesia made by Husband. He took a great interest in his apprentices, and none left his store without being thoroughly imbued with the principle that honesty, industry and faithfulness were incumbent upon all who desired to serve their Creator and their fellowmen. These sterling qualities endeared him to all who came in contact with him.

He relinquished his active interests in the retail drug business a number of years ago, but continued the manufacture of magnesia at his laboratory at Byberry, Twenty-third Ward, Philadelphia, until the time of death.

Thomas J. Husband was a life-long member of the Society of Friends, attending the meeting at the northeast corner of Ninth and Spruce Streets.

He died on January 21, 1898, in the eighty-fifth year of his age, and his passing away was as peaceful as his long life had been useful. Thus has been gathered home another one of the members of the Philadelphia College of Pharmacy who have by their example and consistent walk shed lustre upon their *Alma Mater*, and his loss is mourned by all of those in the City of Philadelphia who had the happiness to come within the sphere of his influence.

JOSEPH P. REMINGTON,
JOSEPH W. ENGLAND,
C. CARROLL MEYER.

The annual meeting being the occasion of statements by the officers and the standing committees, reports were received in the following order. Committee on Publication reported the regular issue of the AMERICAN JOURNAL OF PHARMACY during the year. Sample copies were sent out with each issue, and at the beginning of the new year a number of circulars were also distributed. One gratifying feature as showing the usefulness of the JOURNAL for reference was the unusual number of inquiries for back numbers. The other statements in the Report corresponded pretty closely to those given at the last annual meeting.

The Report of the Editor was as follows:

This report includes the issues of April 1, 1897, to March 1, 1898. The total number of pages published was 672, a decrease of 36 pages from the same period last year; the average for each of the twelve numbers was 56 pages, against 59 last year, and 53½ the preceding year.

The total number of original papers published during the year was 61, occupying 298 pages; these papers were prepared expressly for the JOURNAL, and do not include abstracts, translations or editorials.

The number of authors contributing was 40, 19 of whom were not members of the College. It will thereby be seen that nearly one-half the contributors were non-members. A number of members contributed more than one paper. Original papers were received from contributors residing in Sweden, Trinidad, Mexico and Germany; reprints were received from nearly every country in Europe, and from Australia, those from the latter country have in many instances been published, because they contain information concerning the chemistry of plants not elsewhere obtainable in this country.

It is evident that the interest in the JOURNAL is not merely local in character, but that it exists in every quarter of the globe.

The Librarian submitted the following report:

The Librarian respectfully reports that there have been added to the Library during the past year 165 volumes. Among these are many valuable works relative to materia medica and pharmacognosy purchased from the estate of the late Prof. E. S. Bastin.

There has been expended the sum of $365 for books and $74.18 for binding.

The growth of the Library during the last few years has been so great that it will ere long be necessary to provide additional case-room.

Respectfully submitted,

THOS. S. WIEGAND, *Librarian.*

The following is a summary of the Curator's report:

Your Curator would respectfully report that the Museum is in good condition, and has received a number of valuable additions during the year. Among those who contributed were: Charles Bullock, Richard M. Shoemaker, F. B. Kilmer, Smith, Kline & French Co., John Wyeth & Bro., Frederick Stearns & Co., McIlvaine Bros. and Thos. S. Wiegand, who presented a collection of various metals, such as zinc, antimony, copper, manganese, etc.

The most valuable accession to the Museum, however, has been two collections of rare and costly chemical compounds, by Merck & Co., of New York.

Yours respectfully,

J. W. ENGLAND, *Curator.*

The several reports were, on motion, received, and offered to be placed on the minutes.

Nominations having been made for officers of the College and for three trustees (the latter to be elected for the term of three years next ensuing), the following-named persons were unanimously chosen:

President, Charles Bullock; First Vice-President, William J. Jenks; Second Vice-President, Howard B. French; Corresponding Secretary, A. W. Miller; Recording Secretary, William B. Thompson; Treasurer, James T. Shinn; Librarian, Thos. S. Wiegand; Curator, Jos. W. England; Trustees for three years: Jos. L. Lemberger, Samuel P. Sadtler, William L. Cliffe; Publication Committee: Henry N. Rittenhouse, Samuel P. Sadtler, Jos. W. England, Wallace Procter; Editor, Henry Trimble.

On motion, the meeting adjourned.

WILLIAM B. THOMPSON, *Secretary.*

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 19, 1898.

The regular Pharmaceutical Meeting was held in the Museum of the College at 3 P.M. Joseph W. England presided. The minutes of the previous meeting were allowed to stand as published.

The presentations of specimens being next in order, attention was directed to a specimen of the fruit of the double cocoanut palm, which was received from Dr. J. J. Lemon, of Biloxi, Miss., through the kindness of F. W. Morgan. The original habitat of the plant is given as the Seychelle Islands, and it is distinguished botanically as Lodoicea seychellarum. Owing to the firmness of the shell covering of the fruits, they are carried uninjured many hundreds of miles by ocean currents, and in this way the plant has been propagated in many of the islands of the Indian and Pacific Oceans.

On motion it was ordered that a vote of thanks be extended to Dr. Lemon for the interesting specimen sent by him.

Dr. C. B. Lowe was the first speaker on the programme, and read an interesting paper on "Larrea Mexicana." (See page 235.) The paper contains some suggestions which, it is hoped, will lead to a further investigation as to the therapeutic properties of the plant.

A valuable paper on "The Detection of Mucilage in Plants" was presented by Prof. Henry Kraemer. This was a report of a micro-chemical examination

of a number of plant specimens for the purpose of detecting the presence of mucilage. In some previous work, on the pansy, the author found that he was able to detect this substance by means of a solution of methylene blue. Since then he has applied the test to various specimens and found it to be quite characteristic.

A "Note on the Common Names of Plants," by Prof. J. U. Lloyd, was read by Professor Trimble. (See page 234.) This subject was the occasion for considerable discussion. Professor Trimble said that many instances could be cited where plants have more scientific names than common names, which furnishes another reason for using the common names.

Professor Kraemer said that he saw no chance to lessen the number of synonyms while so many separate schools of taxonomy exist.

Others taking part in the discussion were the chairman, Professor Lowe and Mr. E. M. Boring.

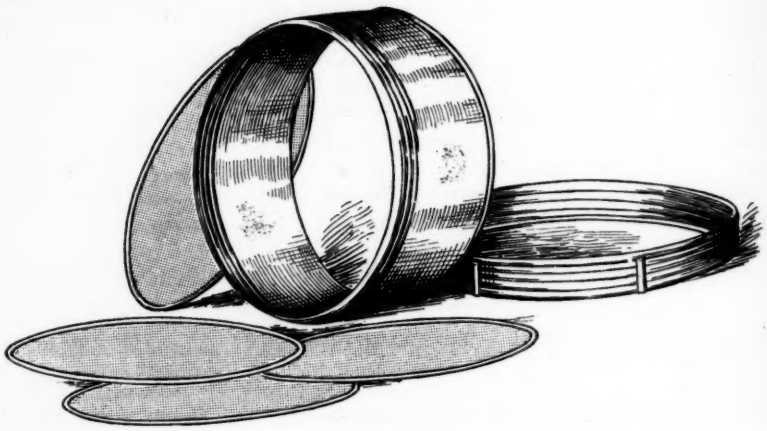


FIG. 1—Pharmaceutical Sieve, with the several parts detached.

A new form of pharmaceutical sieve was exhibited by Professor Trimble, in behalf of the inventor, J. Frank Strawinski, P.D., a member of the recent graduating class. The writer stated, in his description of the apparatus, that the idea of producing a sieve which would lessen the liability to contamination of powdered drugs was suggested to him while attending the lectures on comminution. The accompanying illustrations show the several parts of the sieve in *Fig. 1*, and in *Fig. 2* its appearance when these are put together for use. The body or frame of the sieve is made of brass, which is tinned on the inner surface. At the base of the frame is a coarse threading, and over this a collar containing the sieve-plate is screwed. On the exterior of the collar are five finger-holds, so that it may be adjusted quite firmly. The sieve-plates are made separately, and, in adjusting the apparatus, all that is necessary is to place one of these of the desired mesh in the collar before attaching the latter to the frame. The model constructed by the author has five sieve-plates, each of the proper mesh for producing the degrees of fineness specified in the Pharmaco-

pœia. Several points of superiority are claimed by the author for his invention. These are durability, less liability to contamination, compactness, etc.

An informal talk by Professor Kraemer on "A Recent Botanical Trip to Wilmington, N. C.," was an instructive as well as an interesting feature of the meeting. A number of specimens were exhibited in connection therewith. Professor Kraemer said that the flora of North Carolina is remarkable in many ways. One thing which he noticed is the wantonness with which the inhabitants carry on the destruction of trees. He also said that the State appears to be the dividing-line between Northern and Southern floras. Within its limits are to be found several species of pine which also extend into Northern latitudes, while at the same time are found several species of palm, the members of this group being for the most part found in tropical countries.

The following list includes most of the plants described: (1) Insectivorous plants—Dionaea muscipula, Ellis; Drosera brevifolia, Pursh; D. longifolia, L.; Pinguicula lutea, Walt.; P. elatior, Mx.; Ulneularia inflata, Walt.; U. subulata, L.; Sarracenia flava, L.; S. purpurea, L.; S. rubra, Walt. (2) Climbing

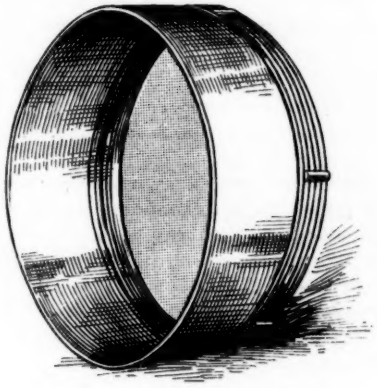


FIG 2.—Sieve complete.

plants—Bryonia capreolata, L. (Cross vine); Gelsemium sempervirens, Ait.; Tecoma radicans, Juss.; Smilax tamnoides, L.; S. laurifolia, L.; S. Walteri, Pursh.; Lonicera sempervirens, Ait; Vitis vulpina, L. (3) Trees, shrubs, etc.—Pinus australis, Mx. (Long-leaf pine); P. taeda, L. (Loblolly or old field pine); Taxodium distichum, L. (Cypress); Hicoria glabra, L. (Pignut); Juniperus virginiana, L.; Quercus cinera, Mx.: Q. cataesbaei, Mx.; Q. nigra, L.; Q. obtusifolia (?); Q. myrtifolia (?); Q. phellos, L.; Q. virginiana and variety maritima; Q. aquatica, Cates; Q. alba, L.; Acer rubrum, L.; Cornus florida, L.; Ilex Dahoon, Walt. (Dahoon holly); I. cassine, L. (Yapon); Nyssa multiflora (Sour gum); Melia azederach, L.; Magnolia glauca, L.; Salix nigra; Sabal Palmetto, Rand. (Palmetto); Sabal Adansonii, Guerns.; Yucca filamentosa, L. (Bear grass); Y. gloriosa, L. (4) Other plants—Tillandsia usneoides, L.; Cabomba caroliniana, Gray; Viola villosa, Walt.; Geranium molle, L.; Lupinus diffusus, Nutt.; Opuntia Rafinesque, Engelm.; Chaptalia tomentosa, Vent.; Iris verna, L.; Alium striatum, Jacq.; Asarum arifolium.

In his remarks on the insectivorous plants, Professor Kraemer said that the Venus' fly-trap grows naturally near Wilmington, but that it is likely to become exterminated. In observing the habits of the plant, he noticed that other portions of the leaf than the hairs are sensitive—which observation appears not to have been noted heretofore.

A hearty vote of thanks was tendered Professor Kraemer for his interesting talk.

On motion, the meeting adjourned.

THOS. S. WIEGAND,
Registrar.

NORTH CAROLINA PHARMACEUTICAL ASSOCIATION.

The Nineteenth Annual Meeting of the North Carolina Pharmaceutical Association will be held at Charlotte, beginning Wednesday, May 18th. The first session will be called at 10.30 A. M.

Headquarters will be at the Central Hotel, the special rate being $2 per day. The railroad rate will be one fare round-trip. Tickets on sale May 16th expiring with the 21st.

As usual the North Carolina Board of Pharmacy will hold its meeting, for the examination of applicants for license, at the same place at 9 A.M., on May 17th, one day prior to the meeting of the Association, when candidates must be present.

Professors Howell, Baskerville, and Mangum, of the University School of Pharmacy, have offered prizes for the best examination in Pharmacy, Chemistry and Materia Medica, applicable to all who may be examined.

Candidates, in fact all druggists, are entitled to the same railroad and hotel rates as members of the Association.

Those desiring to contribute papers should report their titles to W. G. Thomas, Louisburg, Chairman of Committee on Papers and Queries, if possible in advance of the first session of the Association.

Inquiries in regard to the meeting of the Board of Pharmacy should be addressed to the secretary, William Simpson, Raleigh.

H. R. HARNE, *Secretary.*

ANNUAL MEETING AND RECEPTION OF THE ALUMNI ASSOCIATION.

The Thirty-fourth Annual Meeting of the Alumni Association of the Philadelphia College of Pharmacy was held in Alumni Hall on Tuesday afternoon, April 12th, with the President, Henry L. Stiles, in the chair.

Following the Annual Address of the President, reports from the Treasurer and Secretary were read, the latter being to the effect that 107 new members had been enrolled, making an increase of 90 during the year. The number of deceased members for the same period was 17, making the total number of alumni 2,839.

After the reports had been read and adopted, the election of officers for the ensuing year was held, and resulted as follows:

President, James C. Perry, Class of '91; First Vice-President, F. Wm. E. Stedem, '82; Second Vice-president, Theodore Campbell, '93; Treasurer, William L. Cliffe, '84; Secretary, William E. Krewson, '69; Corresponding Secretary, Cornelius E. Spencely, '78; Board of Directors for three years: Joseph W. England, '83; H. L. Stiles, '85; George Y. Wood, '94; William G. Nebig, '86; for two years, Dr. J. Louis D. Morison, '88; Prof. Henry Trimble, '76; William N. Stem, '73; David H. Ross, '78; for one year, Wallace Procter, '72; C. Carroll Meyer, '73; William A. Bullock, '86; John H. Hahn, '81.

The thirty-fourth Annual Reception of the Association, to the seventy-seventh graduating class, was tendered on the evening of the same day, in the College Museum.

After music by Bastert's Orchestra, introductory remarks were made by the President of the Alumni Association, Henry L. Stiles, '85.

Secretary William E. Krewson called the roll of those who had been elected to membership during the fiscal year 1897–98.

The Alumni Gold Medal to the member of the graduating class receiving the highest general average was awarded to Joseph Huntington, and was presented by Joseph W. England.

The prize certificates to the members of the graduating class receiving the highest averages were awarded as follows: Pharmacy, Joseph Huntington, Philadelphia, by Frank G. Ryan; Chemistry, George Augustus Shwab, Nashville, Tenn., by Frank K. Moerk; Materia Medica, Andrew Connell Parse, Flemington, N. J., by Dr. C. B. Lowe; General Pharmacy (Committee), Frank William Morgan, New Orleans, La., by Wallace Procter; Operative Pharmacy, Theodore Storb Schlauch, New Holland, Pa., by Theodore Campbell; Analytical Chemistry, Gilbert Kent Preston, Philadelphia, by Josiah C. Peacock; Pharmacognosy (Specimens), James David King, Easton, Pa., by Dr. J. Louis Morison.

The prize testimonial to the first course student passing the best examinations was awarded to Harry Lionel Meredith, of Hagerstown, Md., by James C. Perry. The prize testimonial to the second course student passing the best examination was awarded to Edward Bancroft Rogers, of Mount Holly, N. J., by F. Wm. E. Stedem.

The class oration was delivered by Clarence O. Snavely; the history by A. Gustav Luebert; the poem by Frederick R. Farrow, and the prophecy by David Dale.

NOTES AND NEWS.

An explosion in a Drug Store in New York, which occurred on April 6th, was of extraordinary character and great violence. This was the result of the compounding of a prescription of potassium chlorate and sodium salicylate. As a result of mixing the ingredients in a mortar the shop was badly wrecked—the damage being estimated at $1,500. The clerk who was doing the mixing was seriously injured.

The Mucilage Cells of Opuntia have been made the subject of a recent study by Longo[1], who states that they occur distributed through the fundamental parenchyma of all members of the plant, that their mucilage does not result from a transformation of the cell wall, but is a direct product of their proto-

[1] *Annuario del R. Ist. Bot. di Roma*, 7, pp. 44-57, pl. 2.

plasm, and that their function is that of a water tissue. The same author has also[1] studied certain crystal and mucilage cells which are found in the branches and fruit of Platopuntias, though absent from the Cylindropuntias.—*The American Naturalist*, March, 1898.

In a paper on "*The Spruces of the Adirondacks*," read before the Albany Institute in November, 1897, Professor Peck states that, though until recently only two species of Picea were credited to the Adirondack region, there is now good evidence of the presence there of four species: P. canadensis, the white spruce, P. Mariana, the black spruce, P. rubra, the red spruce, with a dwarf variety, P. rubra pusilla, and what is held to be a new species, the swamp spruce, P. brevifolia, with a dwarf variety, P. brevifolia semiprostrata.—*The American Naturalist*, March, 1898.

Digestion in Pitcher Plants.—It has been variously claimed that the digestion of proteids in the pitchers of Nepenthes is due to a digestive ferment secreted by them and to the action of bacteria growing in their secretion, Professor Vines, in the *Annals of Botany*, for December, 1897, gives additional corroboration of the former claim, since he shows that the secretion digests fibrin in the presence of 1 per cent. hydrocyanic acid, and that its enzyme retains digestive activity when kept for several weeks in pure glycerin. His studies do not reach to the secretion of the necessary acid, which, in one species at least, is present in the liquid of unopened pitchers, and therefore is not the result of stimulation by the presence of foreign bodies.—*The American Naturalist*, March, 1898.

The Rice Crop of India is reported as the largest crop grown, and furnishes the principal food of nearly 300,000,000 people in that country, while entering largely into the food of the people of Egypt and Asia, besides the quantities consumed in other countries.

The total average yield of the crop for the past ten years has been about 20,500,000 tons, and the value of that exported, after supplying the home consumption, has been about $35,000,000 annually.

The crop of 1895 was much below the average, being especially deficient in Bengal, which produces about three-fourths of the crop of India (including Burma); and the following extract from the final forecast on the crop of that year, issued from the Statistical Bureau in February, 1896, states the particulars in regard to the crop in the three great rice-producing provinces—Bengal, Burma and Madras:

The yield of the crop (1895) is estimated at 20,277,050 tons, more than three-fourths of the quantity representing the production in Bengal, which is estimated at a fraction less than 15,400,000 tons. The return in both Madras (1,950,000 tons) and Burma (2,400,000 tons) is materially larger than last year; but the yield in Bengal is nearly 24 per cent. less, and the total yield of these three provinces is expected to be 18½ per cent. smaller than last year and 21 per cent. below the average.

During the past five years the following countries have taken the rice exported in the order named: Egypt, Asia, the United Kingdom, Ceylon, Straits Settlements and Arabia, while much smaller quantities have gone to Germany and other countries, the United States being among the lowest on the list, in 1895 taking 3,500 tons, but none last or this year, owing, perhaps, to the high price in India and to the increased production in this country.—*Consular Reports*, Vol. LVI, p. 409.

[1] *Loc. cit.*, pp. 79-83, pl. 8.